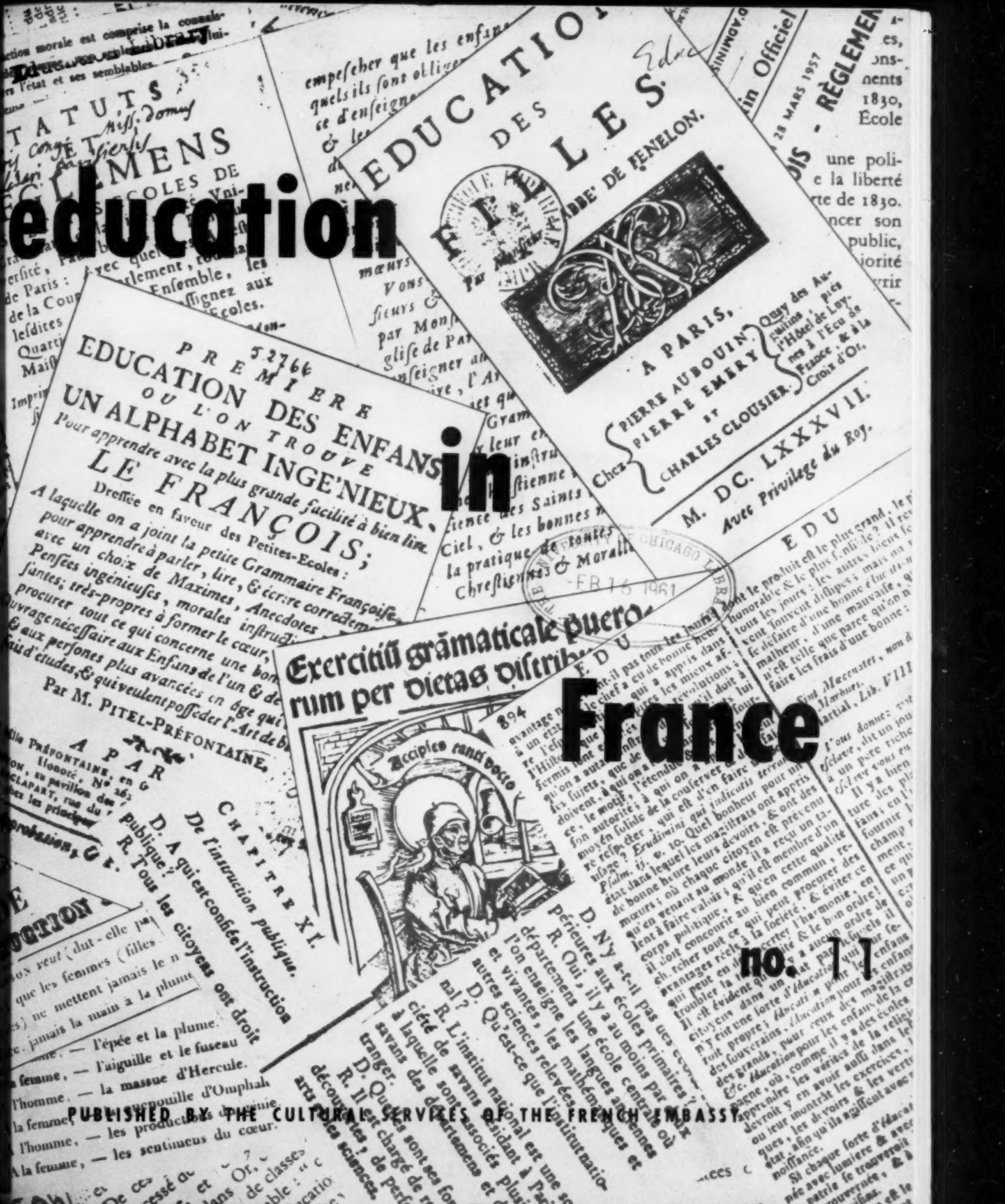
education in France


EDUCATION DES FILLES.
A PARIS,
PREMIERE EDUCATION DES ENFANS
UN ALPHABET INGE'NIEUX,
LE FRANÇOIS;
Exercitiis grãmaticalẽ puero-
rum per dictas discribe-
CHAPITRE XI.
De l'instruction publique.
D. A qui est confiée l'instruction publique?
R. Tous les citoyens ont droit
D. N'y a-t-il pas des écoles primaires?
R. Oui, il y a au moins par
D. Qu'est-ce que l'Institut national?
R. L'institut national est une so
D. Quels sont ses fonc
R. Il est chargé de rec
découvertes, de perfect
arts & des sciences.
M. DC. LXXXVII.
Avec Privilege du Roy.

no. 11

PUBLISHED BY THE CULTURAL SERVICES OF THE FRENCH EMBASSY

EDUCATION

IN

FRANCE

French Cultural Services
New York

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EDITORIAL by MONSIEUR EDOUARD MOROT-SIR

Cultural Counselor

Representative in the United States of French Universities

This issue is devoted to some of the most important aspects of scientific education in France. It presents some very significant views on different areas within this field of education and learning in France: basic research, the training of future researchers and professors, and primary and secondary methodology of teaching in so far as it contributes to building for the nation the solid foundations of scientific knowledge and of scientific culture. We would particularly like to thank M. Debiesse, the director of the Centre d'Etudes Nucleaires at Saclay, M. A. Gribenski, Professor at the Lycée Henri IV, for their contributions.

One of the most striking features of our scientific education is revealed by recent statistics of the Bureau Universitaire de Statistiques of the University of Paris. One learns that before 1940 there were more students in literature than in science; that this ratio was still unchanged in 1950; but that last year the Schools of Science had the greater number of students.

I personally do not believe that that new academic and social trend I have just mentioned indicates that France is about to give up what has often been called her humanistic mission, and which is closely related to her predilection for the humanities. Even if, as one must hope, the number of bacheliers having specialized in mathematics continues to increase regularly in the coming years, the ideal of general culture will be no less attractive for two essential reasons. The first is that our secondary school curriculum retains its traditional flexibility and its balance between scientific and literary subjects, even in the so-called modern or technical classes. Secondly, the scientific teacher at all levels is inspired, perhaps sometimes excessively, by a humanistic ideal as pure and exacting as that of the classicist or the historian. One has only to read the reports of the Congresses of of science professors, especially those of the mathematicians (it will be recalled that French scientific education gives preaominance to mathematics). At some point of the proceedings, a discussion invariably arises on the aesthetical values of order, harmony, elegance, in short, on the inner beauty of a demonstration or of the logical succession of theorems, all this in order to justify scientific education.

Fundamentally, French pedagogy is dominated and guided by two conceptions of science, which are divergent if not conflicting. One, inherited from the Greeks, considers science an harmonious and pure world of concepts rigorously related and united according to necessary laws of logic. This is why the whole system is respected, and when it is suggested that certain theorems or parts of theories should be left out because school programs are overloaded, or because these parts appear useless at the present time, one is intellectually dissatisfied and ready to protest. This also accounts for the artistic approach per se in a mathematical demonstration, the discriminating taste shown in the search for solutions in which supreme elegance is the result of the utmost simplicity. This is the Platonic dream of the world of Ideas, of which the world of mathematics gives a first approximation. The other sciences approach it in so far as they are related to mathematics.

The other conception of science was born with the Renaissance and evidences a double awareness, technical and commercial, which is the origin of the modern world. It has made an artificial instrument out of the mathematical system. Efficiency has become more important than ideal necessity, and therefore the spirit of experimentation and of transformation of the world must stimulate research and inspire our youth.

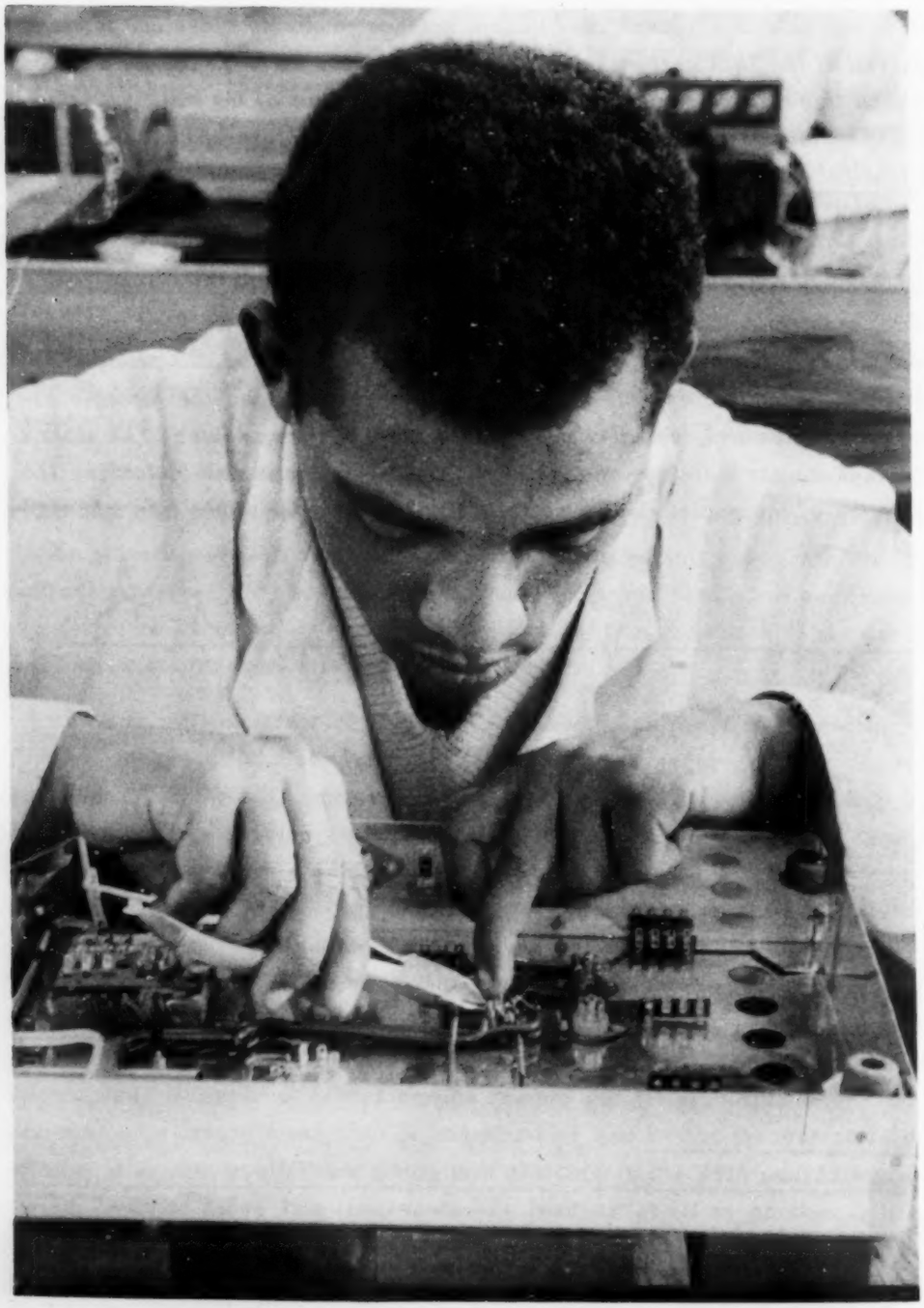
It is well-known that of these two conceptions the former prevails in French pedagogy, and it is easy to predict the consequences of this preeminence. Let us add, however, that this situation does not exist only in France. Even when the second attitude is preferred, pedagogy itself is hardly affected by this priority of experience and action. It has a tendency to remain traditional in spite of efforts, often overly simple, to put the child or the youth in contact with material things and to develop in him a mechanical sense. Here one finds the most serious problem of scientific pedagogy caught in a dilemma from which it cannot escape today. One is usually content to select those who show aptitudes for one or the other of these two scientific approaches. However it is not enough to turn out mathematicians or technicians; a pedagogy must also be constructive and in the present state of affairs, a certain equilibrium which was realized in the 18th and 19th centuries between these two tendencies has been upset. It is as though two sciences, and therefore two types of pedagogical training, walked side by side without ever meeting or with very artificial connections.

Such should be, in our opinion, the aim of pedagogy in the immediate future. It is difficult to foresee whether a solution can be reached. In any case there is a real and strong need. There is not one scientist who does

not feel its urgency. Whatever the situation in the sciences themselves, pedagogy can not afford to remain unsure of its method of approach. It must be based on a new classicism. Modern science found its classical forms at the end of the 18th century and the beginning of the 19th. Today we must go beyond this stage of pedagogy. It must be the objective of the mathematicians and physicists who should lead the way...But the development of a <u>new scientific classicism</u> is difficult and slow.

It is certain that the present French university and school system has become aware of these problems of scientific education. It perhaps feels more keenly than is felt anywhere else the conflict that we have analyzed here. This accounts for the struggle between two humanistic pedagogies, one anti-scientific and the other founded on science, and the struggle between theories and techniques within the sciences themselves. The stakes are high as the solution of these pedagogical tensions will determine the structure of the societies of tomorrow and the character of the men who will build them.

Ed. Monod-fg



Student at the electronic training school at Champs–Sur–Marne

MINISTRY OF NATIONAL EDUCATION REORGANIZED

In 1900 there were 100,000 employees of the Ministry of National Education. Today there are 500,000 and it is predicted that in ten years there will be 700,000. By this time more than half the total number of civil servants will be employed by the Ministry of National Education. The budget is twenty times greater than it was at the beginning of this century: $90,000,000 then, $1,800,000,000 now (1961).

The reform of 1959 making school attendance obligatory up to the age of 16 (instead of 14), has resulted in the number of school age children reaching a quarter of the French population. In addition, secondary education is constantly increasing, and the educational institutions must be prepared to meet the growing demands.

A new plan was devised and approved by a decree passed in May of 1960. It provides for a greater degree of co-operation and liaison between the various services. For example:

- The Inspector General has been placed under the direct control of the Ministry. A "Chef de l'Inspection Générale" will co-ordinate the activities of the various inspectors.

- The Director of General Administration and Community Service: this branch has become more important, it now controls documentation, administration, general studies, judicial and financial affairs, management of personnel of all the services, and the authority for action in all directions. Co-operative services of documentation, training, and pedagogical material have been organized.

- Educational Activities: this branch is concerned with the organization and management of all schools below the university level. A General Director of organization and educational programs directs and co-ordicates primary, secondary and technical education. This office of General Director is one of the essential elements of the new system. Up until now, the different levels were totally independent, without administrative co-ordination. It is hoped that this closer relationship will result in a better orientation for the students, a better use of teachers and buildings, and an agreement among the programs permitting easier transfer from one kind of instruction to another for both the teachers and the students.

The General Director of organization and education programs is M. Lucien Paye, former Rector of the Dakar Academy (1). Thus M. Paye will be responsible for the education of a quarter of France's population. He is charged with the problems of student orientation, new establishments, and changes in the teaching programs in the primary, secondary and technical schools.

- Direction of Medical and Social Services: this branch includes the Students Service, the Fellowship Service, and the Social Service of National Education, which had previously been separate. The social responsibilities of National Education will increase in proportion to the number of children from lower income families who embark on careers including long study. It is a question of material and financial aid, of psychological and moral support, and of control of the health and welfare of the student.

- New structure of the Ministry of National Education:
  - Minister
  - Minister's Cabinet
  - General Inspection

- Direction of General Inspection and Community Service:

  1) Outside activities: Direction of relations between France and the Communauté and foreign countries.

  2) Educational activities: General direction of Organization and Educational Programs.
  - a - Direction of elementary education (former 1st degree)
  - b - Direction of classic and modern sections (former 2nd degree)
  - c - Direction of technical and professional education.

  3) University and scientific activities:
  - a - General direction of higher education
  - b - National center of scientific research.

  4) Post-school activities: General direction of post-school education, youth and sports (2)

  - Community services of documentation, training, and pedagogical material
  - Direction of educational, university, and sports equipment
  - Direction of medical and social services
  - Direction of French libraries.

(1) M. L. Paye is the author of an article on French Education in Africa which appeared in Education in France, No. 9, March 1960.

(2) The High Commissioner of Youth and Sports, assisted by his Cabinet and the General Inspectors, is between the Minister and the post-school section. section.

NUCLEAR SCIENCE TEACHING IN FRANCE AND THE COMMISSARIAT A L'ENERGIE ATOMIQUE.

M. Jean DEBIESSE, the director of the Centre d'Etudes Nucleaires at Saclay and Inspecteur Général de l'Instruction Publique, has kindly consented to contribute the following article dealing with education in nuclear science in France.

1 - The need to develop a training program

At its inception, in 1945, the Commissariat à l'Energie Atomique drew up an inventory of personnel needs as a function of the country's Atomic Energy development plan. These needs were considerable!

Geologists and miners were necessary for the prospection of ores; chemists for the preparation of uranium, graphite, heavy water, full-canning metals; large numbers of electronicians for counting and radiation detection; physicists and mathematicians to interpret and solve the problems which arose. And all these scientists needed for the new energy development had to be backed by a large staff of assistants and specialists.

The percentage of qualified scientists is three times greater than ordinary industry. In addition these specialists were needed immediately.

In 1945 however the French Universities, hard hit by the 1939-1945 war, were slowly and with great difficulty reintegrating their newly demobilized professors and students.

Qualitatively speaking, the French Universities, were not easily able to supply the necessary specialists in atomic energy. For six years occupied France had been unable to continue work in the nuclear sciences which before 1939, her scientists had very largely contributed to create. On the quantitative side, the Universities were faced with the task of meeting enormous demands for qualified scientists.

In addition to the problems of reconstruction, industries interested in productivity were reopened or created. It is only necessary to recall the success achieved since 1945 in various

fields, such as electronics, the car industry, applied chemistry and the petroleum industry to comprehend the extent of the industrial development. And so, for 15 years, there has been a chronic shortage of scientists and technicians. At this point, it is a good idea to take stock of the results obtained in the scientific training program during this same period. It will be immediately apparent that the Ministry of National Education has made a great step forward, quantitatively speaking. At the lower end at the scale, the yearly number of baccalaureat graduates in elementary mathematics has increased progressively from 6,500 to 15,000 which in 15 years amounts to a total of 30,000 extra scientific candidates.

The number of graduate scientists leaving the Universities and Science Faculties has increased from 4,000 to 5,800 extra trained scientists.

At the same time the period of study in scientific schools has been increased by a year and the science Faculties have created 3rd cycle courses of higher level. The conventional training was improved qualitatively at all levels.

This large-scale effort on the part of the Universities may be compared with the rate of development of the Commissariat à l'Energie Atomique, which was in fact much faster. From 1945 to 1960 the C. E. A. alone recruited 4,500 baccalaureat graduates in mathematics, or 15% of the 30,000 extra formed, and 2,500 trained scientists, or 30% of the extra 8,000.

These new recruits received their specialized training in nuclear energy from the C. E. A. itself. Without this personal effort it would probably have been impossible to promote our country to the position which it occupies in the world to-day.

How has this been carried out? From the beginning the C. E. A. undertook a double task. On the one hand public opinion had to be won over to the new science in order to attract candidates to fill the posts created, and on the other hand highly specialised training had to be given to the boys and men coming from traditional schools and universities.

II. Publicity policy of the C. E. A.

By means of conferences, exhibitions, newspaper articles and films, a trend in public opinion was created and maintained.

The aim was to show the wide range of possibilities opened up by careers in atomic energy. Because of the shortage of scientists the nuclear science industry could not undertake alone a recruiting publicity campaign at the expense of the other scientific and technical activities of the country, so the appeal was made more general. The aim was to increase the number of scientists by directing a greater fraction of the nation's youth towards scientific and technical careers.

In collaboration with the heads of the second Degree and the technical training bodies, a publicity campaign was launched in the schools and to the parents of students, by means of conferences and travelling exhibitions, organised with the cooperation of the Musée Pédagogique. It was necessary also however to improve the normal scientific training and bring it up to date. "Atomic" classes were formed in the big secondary establishments; opportunities were provided for professors to spend periods working in the atomic energy centers; the C. E. A. sent lecturers, films and experimental equipment to scientific and technical schools and Faculties.

Before long nuclear science was taught to different degrees in all the important establishments. A large number of young people applied for admission to the Commissariat à l'Energie Atomique on leaving school.

The C. E. A. no longer had recruiting difficulties, but it still needed properly trained specialists. This was the next task.

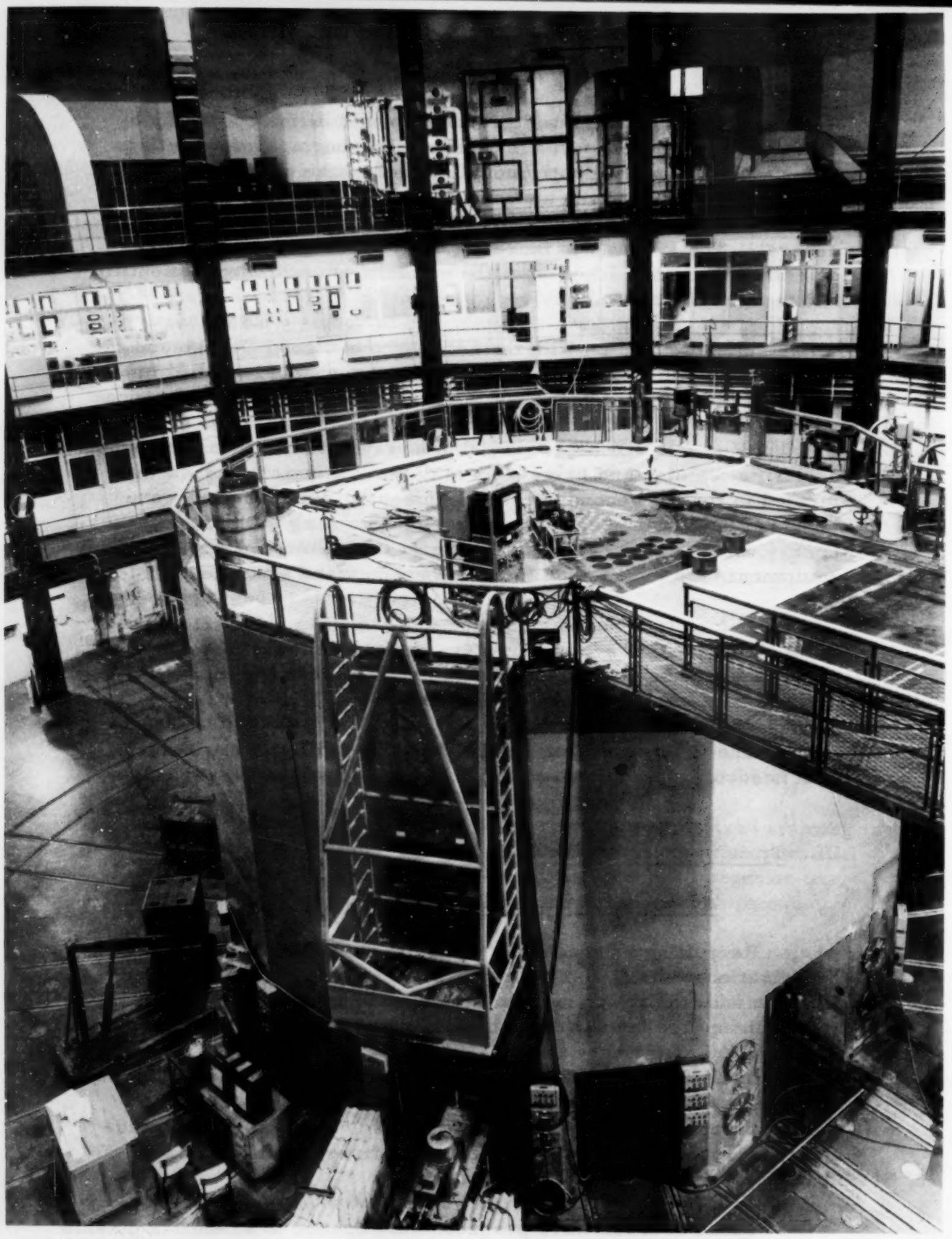
III. Training policy of the C. E. A.

A) Advanced teaching within the C. E. A.

Recruiting young people with normal scientific and technical qualifications, the C. E. A. had the task of turning them into specialists. In addition it was necessary to encourage in them a taste for research and the faculty of continuous adaptation to new conditions.

In all departments seminars were organised, weekly for the most part, in order that all members should participate in the work and problems of the moment. Courses were given and gradually developed into regular series of lectures given by our own specialists or by University professors.

These courses were progressively opened to scientists outside the C. E. A. Eventually the relationship between the C. E. A. and



The Saclay Nuclear Research Center

"EL 3" reactor, built for experiments in high neutron fluxes
(in particular the testing of materials for power reactors)

the University was set out in a series of decrees creating:

L'Institut National des Sciences et Techniques Nucléaires de Saclay (1)

"This organization, placed under the authority of the President du Conseil and the Ministre de l'Education Nationale, was created for the following purpose:

" 1° - to provide, in close collaboration with the Universities, highly specialized education in nuclear science and techniques, designed to complete the training of scientists and technicians;

" 2° - to maintain a permanent collaboration with regard to these courses between the Science Faculties, the Medical Faculties, the Pharmaceutical Faculties and the big scientific schools on the one hand, and the Commissariat à l'Energie Atomique on the other;

" 3° - to encourage easy relationships in the field of education and research with research and industrial organisations".

This Institute possesses an Education Council attended by 14 University members, 10 C. E. A. representatives, 2 representatives of the Ministere de l'Industrie et du Commerce and 1 Agricultural representative. This body awards diplomas after examinations, under the auspices of the Ministère de l'Education Nationale.

The educational program is as follows:

a) Third Cycle course:

With the agreement of the Paris, Grenoble and Poitiers Science Faculties, certain two-year post-graduate courses are organized at Saclay in the following fields: radiology, thermal problems in nuclear reactors, specialised metallurgy, particle accelerators.

The diploma issued by the Institute after the first year of study is equivalent to one of the certificates necessary for the

(1) Decree of 18 June 1956; orders of July 16th, September 6th, October 2nd, November 5th and 9th and December 3rd 1956.

degree which leads up to a 3rd cycle doctor's thesis. This later is presented before a jury consisting of University professors and professors from the Institut National des Sciences et Techniques Nucléaires.

b) Specialised atomic energy training for scientists

This course is intended for scientists in industry, detached to Saclay for a year, and consists of basic training and practical work, with periods of work on French reactors. A reactor project is worked out by the candidates who eventually take an examination.

Refresher courses are held after five years, enabling former students to keep up to date with new techniques.

Two other schools work in more or less close collaboration with the Institut National des Sciences et Techniques Nucléaires. These are: The Grenoble Ecole Nationale Supérieure d'Electrotechnique (1) and the Cherbourg Ecole d'Application Maritime de l'Energie Atomique (2). In these establishments, professors from Saclay take part in lectures and in final examinations. Students spend 4 to 6 weeks working at the Institut National des Sciences et Techniques Nucléaires at Saclay. With the exception of a few specialised subjects, the courses given in the three establishments follow the same lines.

c) General courses:

These courses last from 2 to 6 weeks and are addressed, as the case may be, to: - doctors and pharmacists - scientists, professors, and teachers. Twice a year a 6-week course is organized to teach techniques in the use of radioelements, and is very popular. Twice a year also a 6-week course on the operation of nuclear reactors is held.

In all, the Institut National des Sciences et Techniques Nucléaires numbers about 350 students or scientists from outside the C. E. A. in addition to members from inside. Amongst these external students some 60 to 80, according to the year, are foreigners.

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(1) Decree of June 10th 1959 - (2) Decree of August 2nd 1958.

These foreign students are generally supported by scholarships, which are paid:

- either by the foreign governments,

- or by large international organizations ; Agence Internationale de Vienne - O. E. C. E. - EURATOM,

- or by the Enseignement Supérieur Français,

- or by the C. E. A. itself (1).

De Broglie grants are awarded to foreign specialists in nuclear science to enable them to spend from a few months to two years in our laboratories.

Foreigners may also obtain grants permitting them to come and follow a 3rd cycle course at the I. N. S. T. N.

Since its formation the Institut National des Sciences et Techniques Nucléaires has issued:

- 296 degrees in atomic science,

- 30 specialized metallurgy diplomas,

- 66 particle accelerator diplomas,

- 6 diplomas in heat properties of liquids,

- 13 radiobiology diplomas.

Over 3,000 people have taken part in the courses at Saclay.

B) In the field of higher technical education,

- An Associate Center of the Conservatoire National des Arts & Métiers, has been created at Saclay.

Lectures and practical work in mathematics, physics, chemistry, modern languages, quantum mechanics and wave

(1) Applications should be addressed to the I. N. S. T. N. (B. P. No. 2, Gif-sur-Yvette-(S. &O.) France.

mechanics are organized for assistants, draughtsmen etc... Generally speaking an employee can spend 14 hours a week on courses, on the following basis:

- 5 hours from his working time,

- 9 hours from his free time.

Each year, students take the examinations of the Conservatoire National des Arts & Métiers.

After two years of study a gifted student, having successfully passed all his examinations, may spend a year with full pay at the Conservatoire to finish his general studies. Returning to the C. E. A. the following year he may then spend a year working on a research project and after this he can receive the title of qualified scientist. This particular training thus takes four years to complete.

The Associate Center was formed two years ago. It has issued:

- 185 diplomas the first year,

- 250 the second.

Worthy of mention in another field is the work done by the Direction des Recherches Minières, which for 10 years has operated a prospecting school from which several hundred specialists have graduated.

Finally, a system has been created by which workmen with no diplomas may become laboratory assistants fairly quickly.

Together with the Ministère du Travail, the C. E. A. has organized Centers for the training of laboratory assistants. It sends scientists and assistants to give courses for example, at the Champs-sur-Marne School. A workman possessing no university qualifications can apply to take an examination. If he passes he receives a grant to spend a year in one of the training centers. After this, he becomes a laboratory assistant.

IV. Courses organized outside the C. E. A., with our collaboration

In the higher education field, 11 of the 17 Science Faculties: -

Paris, Grenoble, Lyon, Poitiers, Toulouse, Strasbourg, Algeria, Caen, Nancy, Marseille, Bordeaux - at present work in more or less close collaboration with the C. E. A. in the teaching of nuclear science. This is true also of two Medical Faculties, those of Paris and Marseille. According to requirements the Commissariat provides professors, lecturers, heads of practical work, experimental equipments etc... Most of the big science schools in the Paris area include a series of lectures every year given by Commissariat scientists (for example, 3 professors from the C. E. A. teach nuclear science at the Conservatoire National des Arts & Métiers).

Finally, a special mention must be made of the two year old association between the Institut National des Sciences et Techniques Nucléaires and the Associate pour le Perfectionnement Pratique des Cadres des Entreprises Industrielles. This latter organisation, founded in 1956, has three main purposes, one of which is the teaching of practical applications of nuclear energy (PRAIEN). The aim of PRAIEN is to provide scientists already in industry with the additional training necessary to adapt them to the industrial applications of atomic energy. Courses are given by the most competent specialists in nuclear industry, and include 74 lectures of an hour and a half, given in the evening after work. The course is completed by visits to laboratories and nuclear installations, and periods of practical work at the I. N. S. T. N. at Saclay. Attendance at the annual sessions has averaged around 60 persons. Groups of industrial scientists taking this course in the last years include:

- 14 from the Ecole Polytechnique

- 20 from the Ecole Centrale de Paris,

- 10 from the Ecole des Arts et Métiers.

PRAIEN thus adds a useful contribution to the undertaking of the I. N. S. T. N. by offering a wide range of possibilities to industrial scientists who wish to specialize in nuclear science.

V - Conclusion -

In this way the Commissariat à l'Energie Atomique furnishes a considerable effort in the training of nuclear specialists. The successes gained in this field, which have made France the fourth world atomic power, are partly the result of this action.

The Commissariat pursues its teaching activities in full

collaboration with the University. The courses, at first reserved for French students, have been enlarged to include foreigners in ever-increasing numbers. Saclay, which harbours the Institut National des Sciences et Techniques Nucléaires, has become a sort of "nuclear" faculty of which the influence is continually growing.

The Saclay Nuclear Research Center: Bird's-eye view

RESEARCH ON THE USE OF SOLAR ENERGY AT THE UNIVERSITY OF ALGERIA

An Institute of Solar Energy was formed at the University of Algeria August 17, 1959. Monsieur Marcel Perrot, professor of science, has been named director. The following are some extracts from an article by M. Perrot, which appeared in the Revue de l'Enseignement Supérieur, No. 4, 1959, pages 80-90.

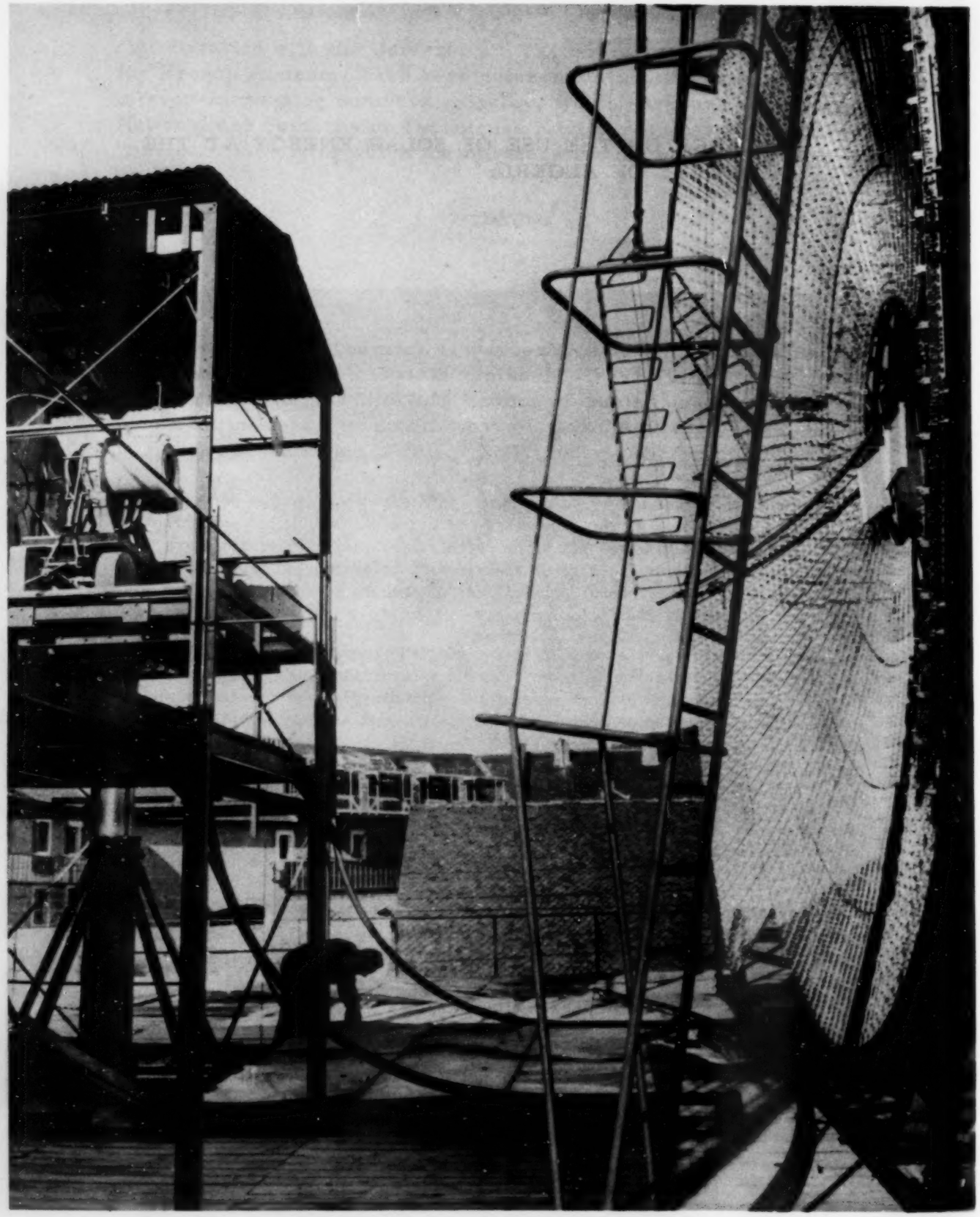
Research on the use of solar energy in Algeria was started before the war. The HELIODYNE, a mirror 8.40 meters in diameter, was installed at the solar station at Bouzareah. Its power potential at very high temperatures is the greatest in the world. Most of the research being done at the university is now oriented mainly toward possibilities of the use of solar energy. Work is now in progress in the following areas:

Photoelectricity, thermoelectricity, electric conversion, tapping sources of solar energy, hydraulic problems, solar air-conditioning of homes (a committee of engineers has established several projects designed for various regions of the Sahara, using solar energy to cool the air and heat water), the use of light and heat in chemical processes (different kinds of glass and aluminum mirrors and solar ovens are now being experimented with).

Other possibilities have recently been explored in co-operation with biologists. All the various specialties such as biology, medicine, physics, etc., which have an interest in this field of study are coordinated by the University Institute of Research on Solar Energy.

Tapping solar energy for use as a source of electricity is one of the most important problems for the future of space travel. It is actually the only external source of energy available for missiles, artificial satellites and space shapes.

Algeria, with the Sahara, is well situated to benefit from the advantages which solar energy can provide for its economy. It now seems that within five years very important developments will confirm the hopes which research workers have for the exploitation of this rich and almost untapped source of energy.



Solar Oven at MONTLOUIS, France

TEACHING NATURAL SCIENCES IN SECONDARY SCHOOLS *

By A. Gribenski

This article was written by a teacher in a French lycée, a man who every day teaches the elements of biological research to boys 11 to 18 years old. Our readers will undoubtedly be interested in seeing that the author feels very strongly that he is participating in the training of men who are thinking individuals, and not simply future biologists. This idea is widespread in secondary scientific education.

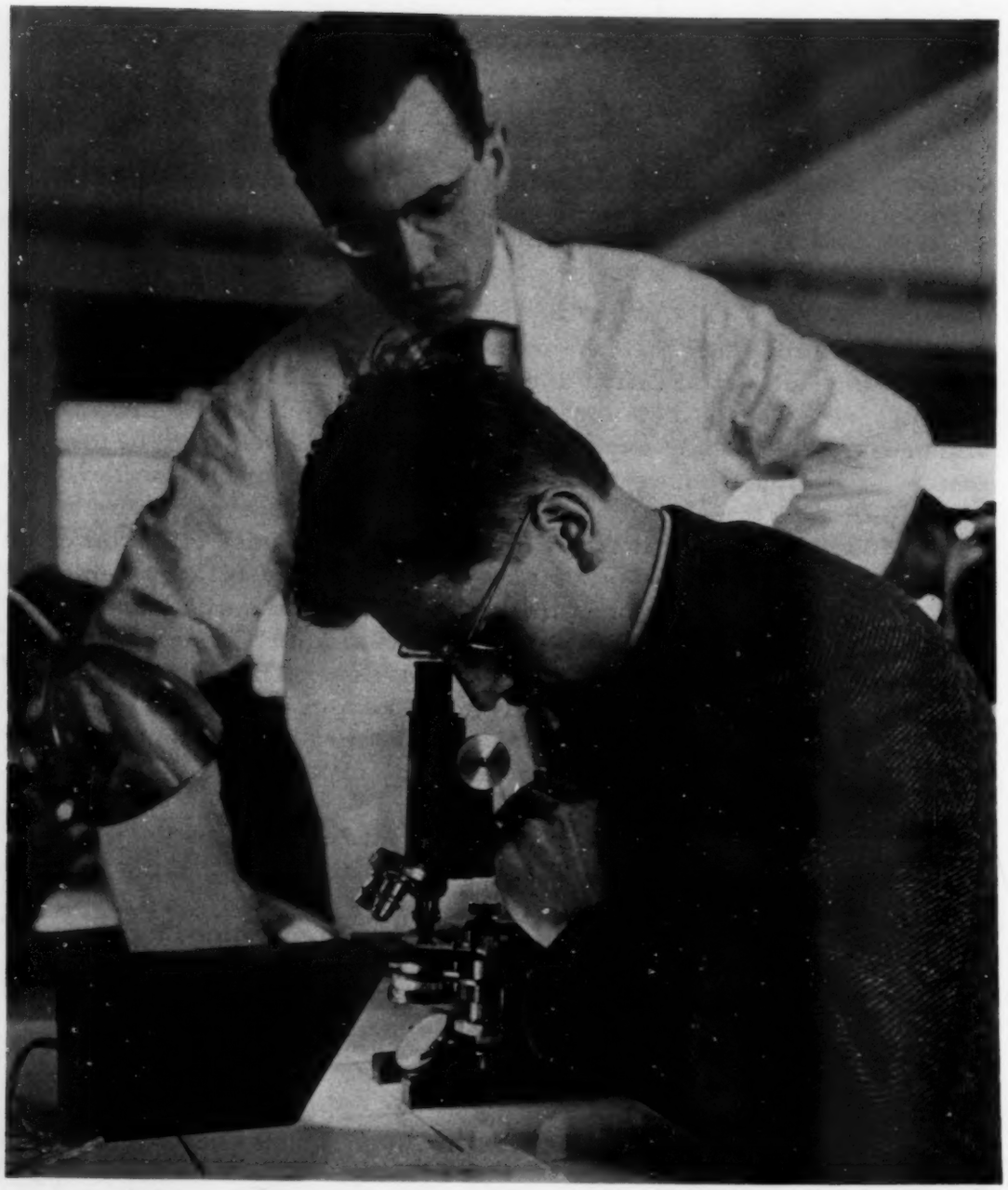
If we may say that the mission of secondary education is to develop intellectual abilities and to provide pupils with resources of personal culture, it is apparent what part is played by the natural sciences. Their study encourages such qualities as: a taste for patient and minute observation, honesty of observation and demanding intellectual integrity, a critical sense towards even the most self-evident interpretations, reflection on the results of observation and experiment, efforts to abstract from them and relate them to other observations and experiments, intelligent use of background information and books, the effort to express clearly the results of an observation, experience, or interpretation. Through their own work, during the course of experiments done in class and in the laboratory, the students learn the value of these methods and requirements, which are so essential to the study of biology.

Latin and geometry are taught to students who will never be Latin scholars of mathematicians: it is not in order to know a certain page of Cicero nor the characteristics of a certain geometric figure, but rather because the translation or the problems demand thought and reason. Biological experimentation and observation have their own educational value as do the pupil's individual exercises in other subjects.

The value of biology instruction

In order for this instruction to be of value, it must be conducted with as much discipline as real research is. Observation and experimentation should neither be faked nor merely consist of rapid verifications of what's in the book. The pupils, under the teacher's direction, are placed in actual scientific working conditions which, although not beyond their level of ability, are nevertheless those of true scientific work. It is by working on known and limited subjects

* EDUCATION NATIONALE- No. 13, 31 MARS 1960.



Laboratory in a Natural Science class

that the pupils can sense the difficulty of establishing facts and especially biological laws. They will better understand the amount of work, effort, and time the progress of science demands, because they have had a living experience.

They are better able to understand the differences between a fact, an interpretation, an hypothesis and a theory. They can acquire an adult scientific attitude, which is as far from the quick affirmations and definitives of popularized simplifications as from the systematic scepticism of those for whom science is nothing, if it doesn't explain everything immediately.

If the pursuit of truth demands effort and mental discipline, it also provides a source of joy which is an important part of the cultural value of teaching. At every step it leads to the discovery of beauty in living things..... one only need observe the emotion of a group of students before the heart of a frog which beats regularly in its liquid bath, expelling with each contraction a jet of blood, or witness their surprise and delight at seeing the cilium of a mussel's branchiae vibrate under the microscope. This emotion leads to a love and respect for life. It can contribute to the birth of an interest in biology and can orient the pupils' curiosity towards this kind of problem.

Training in the natural sciences begins in the first cycle (age 11 - 12) and finished in the terminal classes (age 17 - 18). It demands a great deal of practical work experience, which is why the naturalists hope that the new time schedules will go into effect soon. Actually the new time schedules, adopted at the same time as the new programs (1) have not really been started yet except in the "experimental sciences" classes.

The "Experimental Sciences" Class

After the first part of the baccalauréat the "experimental sciences" class is opened to students with scientific interests, especially those tending more towards the experimental than the mathematical. The teaching of physical and natural sciences culminates the training of these students, while other students benefit more from a predominantly philosophic education in the philosophy class, or mathematics in the "elementary mathematics" class.

Thus, fortunately, each kind of intellect can find in the terminal classes the intellectual contribution of all the disciplines, as well

(1) OCTOBER 1, 1958

as intensified programs in each. The "experimental" character of the experimental science class must be clearly defined in the interest of those pupils who would benefit more from this education than from mathematical or philosophic training.

Unfortunately for most of the pupils who arrive in the terminal class, the work must be started all over again, since the natural sciences are interrupted in the second class (2). The continued training in the biology studies is now reserved for one of the modern sections (3), where it has given excellent results. We hope that continued biology studies can be offered to other second degree students. Those who can benefit by it will undoubtedly find great intellectual profit, whatever their later studies may be.

(2) SECONDE: FIFTH CLASS OF THE LYCEE, EQUIVALENT TO SENIOR YEAR IN HIGH SCHOOL.

(3) IN FRENCH SECONDARY EDUCATION THERE ARE FOUR CLASSICAL SECTIONS (REQUIRING LATIN), AND TWO MODERN SECTIONS (NOT REQUIRING LATIN)

Chemistry laboratory at the National Technical School of Montluçon

THE NEED FOR ENGINEERS

The need for engineers is a pressing problem for France at this time, as well as in most other countries. A study by M. Vermot-Gauchy was published in 1956. It aroused a great deal of controversy.

The need: According to Mr. Vermot-Gauchy, the need for engineers is estimated accordingly:

Engineers employed in 1955	120,300
Shortage of engineers in 1955	8,000
Increase in shortage between 1955 and 1960	19,000
Total	147,300

Available personnel: of the 120,300 engineers employed in 1955, around 15,000 retired before 1960, leaving 105,000

The number of new engineers entering the economy is around 4,000 a year, totaling in 1960 20,000

Total..... 125,000

The total shortage in 1960 will then reach 23,300

Annual training of new engineers

Using Mr. Vermot-Gauchy's methods as a basis, the University Bureau of Statistics (B. U. S.) has studied possible improvements of the situation in the light of recent figures concerning the training of engineers.

Schools granting the degree:

The number of engineering degrees awarded has been growing constantly since 1953, from 3,040 in 1953 to 4,730 in 1958. It should reach 5,780 in 1961. This constant increase from 1953 to 1961 is largely due to the recruitment efforts of the existing schools which have almost all enlarged their program. The rest may be attributed to the creation of new schools and the recent trend of some technical shcools to grant engineering degrees.

In its predictions the B. U. S. estimates that these same conditions will continue and that the number of degrees awarded will continue to increase at the rate of 350 per year. It is possible that this increase may become geometric, at around 8% a year, but it would seem more realistic to assume that it will remain arithmatic, at least until 1970.

Science graduates in industry

An inquiry conducted by the B. U. S. in 1957-58 among 400 former students of the Faculty of Sciences in Paris showed that for each graduating class, 1950, 1951, 1952 and 1953, the proportion of graduates entering industry was 35%. Some of these graduates continued on to receive engineering degrees.

In view of these facts, the B. U. S. considers the Faculty of Sciences as an engineering training school for twenty percent of its graduates. This does not mean, says the B. U. S., that this situation is to be considered as normal, nor that the science license diploma is the equivalent of the engineering degree. But it must be admitted that the shortage of graduate engineers and the small number of first rate engineering school graduates has led industry to recruit a portion of their personnel from the science license graduates, and to use them especially in research and control laboratories where they are given the same title as engineers.

Estimates of the need for engineers vary greatly. Here is another viewpoint.

The "Commission de la Main d'Oeuvre" au "Commissariat au Plan"(1) has estimated in its report that France must train three times more engineers each year: 12,000 instead of 4,000. At present there is a need for 29,000 engineers, 11,500 mechanical, 7,850 electric and 3,500 chemical.

It has also been estimated that 25,000 technicians are needed each year, and at the present time between 13,000 and 15,000 are being trained in public and private schools.

The Number and Distribution of Engineering Degrees granted in France in 1958

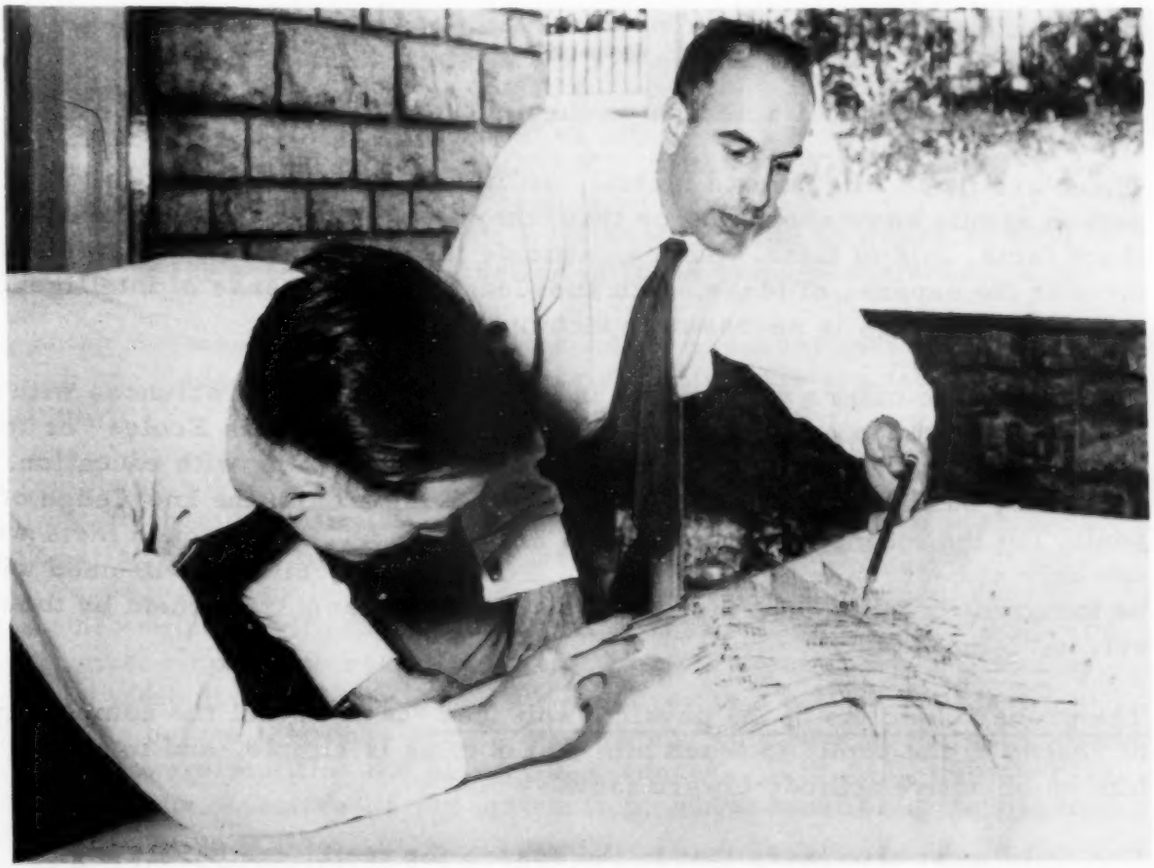
	French	French Union & Foreign		French	French Union & Foreign
General	1,194	29	Metallurgic	32	5
Aeronautical	110	3	Geological & mines	281	22
Agricultural	375	28	Radio communications	102	7
Chemical	494	23	Textiles	38	1
Naval installations	29	1	Topography	61	
National defense	289		Transportation	25	
Electricity, electronics	947	58	Public Works	293	16
Nuclear	23	1	Miscellaneous	59	
Industrial Refrigeration	28			4,520	209
Mechanical	139	9			

(1) Labor Committee in the National Planning Department.

This number of 4,729 (of which 172 are foreigners) shows an increase of 215 over 1957, or less than 5%. The number of French graduates is 4,520, compared to 4,300 in 1957, and 4,064 in 1956.

The greatest relative increase among the specialities has been the fields of metallurgie, mining and chemical engineering. Engineers specializing in radio-communications, mechanics, and public works have also shown a marked increase.

On the other hand the number of general engineers has not appreciably increased although it is still the highest of all the categories of engineers. The number of agricultural engineers shows a slight decrease.



A geology class at the Petroleum Institute.
"Under this impermeable dome, petroleum forms 1500 m. deep'

TEACHING PHYSICAL SCIENCES IN SECONDARY EDUCATION

The monthly review, LES CAHIERS PEDAGOGIQUE pour l'enseignement du Second Degre, dedicated two issues to current methods and problems of teaching physics and chemistry in the lycees and other secondary schools. The first (number 9) October 15, 1958) contains an article by M. Guy Lszerges, a former teacher of physical sciences in the public schools, and presently Inspector General of physical sciences in Public Education. In these capacities the author has had many opportunities to observe teachers in their classroom work. His experience permits him to recommend certain methods and to criticize certain weaknesses. He favors a system which he calls the "natural method". This system is accepted by almost all teachers although details of its application vary from one class to another. Here are some extracts from this article:

I/ OBJECTIVES

Why teach the physical sciences on the secondary level?

There are those who favor a factual, utilitarian education, "the cultured person should know about this or that" they say. These teachers tend to teach facts, lots of facts. Such an attitude tends to swell the program with facts at the expense of ideas, with knowledge at the expense of intelligence, and this knowledge is necessarily incomplete.

Then there are others who believe in teaching the physical sciences with an eye to the entrance examinations of the scientific "Grandes Ecoles" or to future careers. This attitude confuses technical training with education. In secondary education "it isn't a question of giving a child the knowledge of an adult, but the means of acquiring this knowledge".... If we teach facts we can only at best teach those of today. But what our children will need will be tomorrow's facts, and they must be capable of acquiring them by themselves, tomorrow.

The proper objective of the physical sciences is to reveal the complexity of reality to the pupil, to teach him that nothing is simple, and to create in him an objective attitude toward facts.

The child must also learn that in the search for truth, the purely logical method is not the only one. Another way is possible: the experimental method, often the most rapid and the surest.

These objectives call for an authentic experimental method. Also, the physical sciences must not be separated from the other disciplines in the common goal of education, the development of spiritual values. Man must

be shown in his efforts, physics and chemistry must be related to history, to geography, to philosophy (in the terminal class), and of course, to mathematics.

II/ METHODS

For a long time the dogmatic system had been used almost exclusively: the teacher dictates to the students in great detail what he wants them to learn. No matter how intelligent, clear, and gifted the teacher is, this approach leaves the pupils indifferent or discouraged. Fortunately, these bad procedures have disappeared. The "dictated" course is expressly forbidden by official ruling. However, this dogmatism is often used as a supplementary means. There are certain lessons which must be learned and must be memorized to be learned. The principles of the "natural method" are now widely known, although sometimes badly applied:

I) FROM THE CHILD TO THE ADULT

The teacher must always find the intellectual level of the child and adjust to it even in choice of vocabulary, for words are actually ideas. The adult level must never be used as a substitute.

2) FROM THE KNOWN TO THE UNKNOWN, or the "REDISCOVERY"

The known is that ambiguous body of knowledge created by everyday life; the unknown is the scientific explanation of these same phenomena.

In beginning the teaching of physical sciences the teacher must first determine how much knowledge the child already has and eliminate any false ideas he may have.

The "rediscovery" consists of passing from the general observation of phenomena to the scientific laws which govern them, and then if possible to an explanation of these phenomena. This method has been applied in the French secondary schools for at least thirty years. The "rediscovery" must not be confused with the real discovery or invention. On the contrary, the pupil must be made to realize that a law exists somewhere in his mind. It would be ridiculous to have the pupils discover in a half an hour a law which Kepler before them has sought for years. This kind of false discovery dangerously oversimplifies the history of sciences. It is an intellectual lie. It contradicts the objective of our instruction, which must be to reveal the difficulty of finding truth.

OBJECTION

The rediscovery method is very time-consuming. But because of the examinations and competitions the teacher must follow a definite program in each class, and he must go fast. If there are time limits it may be necessary to

choose some especially fruitful subjects to study by the rediscovery method and to employ a more dogmatic approach to the other subjects.

3) FROM THE CONCRETE TO THE ABSTRACT

This rule is very important for pupils from 13 to 15 years old. Later the pupils' interests evolve towards the intellectually abstract, but when addressing the whole class at this age it is better to start with the concrete. This is different to the child than it is to the adult. For example: bringing a litre of water to a boil is an operation the pupils have frequently performed. Bringing a cubic metre of water to a boil is an abstraction for them since they have never had the occasion to measure and heat a cubic metre of water. For an adult the two exercises are identical, but the egocentricity of the child makes him more interested in the first.

These rules - "from the child to the adult, from the known to the unknown, and from the concrete to the abstract" are repeated everywhere and are used in publicity slogans for text books. There was even an editor who, having understood all of this rather badly, added "from the simple to the complex", which contradicts all that went before, because the concrete is necessarily complex and so is the known. An abstraction consists of simplifying, or disengaging a simple idea from its variable and complicated concrete context.

III/ EXPERIMENTAL TEACHING

A contemporary novelist satirizes physical teachers: (Cesbron, Our Prison is a Kingdom)

"X... (a pupil) fell in love with the bunsen burner, the pneumatic machine, and all those well-kept and precious instruments made of polished wood, glass and copper which were used to demonstrate pure evidence. Ah, ... to prove the weight of objects, the temperature of boiling water and of ice... To pose, after a thousand loving preparations, an object on a slanting plane and watch it roll down as predicted. It was decided that he should become a physical science teacher."

The teacher doesn't have to prove what is already known: that an object falls, that the rate of evaporation increases with the surface area (every child knows that you have to spread out a bathing suit to make it dry). Every day life is full of spectacular experiments.

The necessity of a real experimental teaching is understood by everyone from the Minister of National Education to the laboratory assistants, and in the last thirty or forty years we have equipped our laboratories. Thanks to the "Centres d'equipment" today even in the most rural schools we can find equipment permitting authentic experiments. The desire for experiments

among the teachers is remarkable, especially since it demands so much time and effort. However, the attitude of the pupils towards experiments is still a little disturbing: they love to see them and do them, but often it is because of the spectacle and the game, without very much intellectual curiosity. We will only be sure of providing an experimental education when the pupils regard the experiment with scientific doubt, with intellectual rebellion. It is up to us to give them this attitude. We are responsible. To do this:

- There must be experiments in class
- They must be carefully chosen and there mustn't be too many
- They must be proven
- The experiments which "missfire": an experiment which doesn't prove what it is supposed to is still an experiment, it proves something else and this must be discussed.

The result always conforms to certain laws. The reason for the failure should be found, and the conditions responsible modified. The experiment should be done with an explanation of the cause of failure.

LABORATORY EXERCISES

In the traditional teaching method, the teacher first explains the lesson in class, then the pupils go to the laboratory and verify what they've learned. Here is another method: A problem is studied by the pupils in practice, then in the following class, the teacher organizes and completes the results obtained by the whole group. Thus we are sure of going from the known to the unknown and of practicing a cooperative teaching. This makes it possible to begin laboratory exercises from the first day of the school year. The pupilswill get to know the material as they use it and not be copying the apparatus from abstract diagrams in the book.

Certain subjects can be studied completely in the laboratory. During the period (which must last at least 1 1/2 hours), the results obtained by the pupils are compared and explained in such a way as to lead to a conclusion. For example: measuring length, the idea of the margin of error, the scales, Mariotte's law, calormetric measurements, the formulas for spherical mirrors or lens, Ohm's law. But "class manipulation" must not be abused, it can degenerate into directed tasks which drain the students' initiative.

Experiments Sheets

In many classes a mimeographed sheet is distributed to the pupils before each lab session. However, if all the pupils are studying the same subject,

these sheets are useless, the teacher's explanation is more effective. In any case, the sheets should be handed out at the beginning of the class and not several days before, otherwise the students will read them and not understand them. To be avoided are printed notebooks of laboratory exercises in which everything is arranged like an income tax form and the pupil fills in the boxes. These notebooks never correspond to the available material which varies from school to school. They reduce everybody's initiative and thought.

Each pupil should have a personal notebook in which he keeps a record. He notes what results are obtained, the date, and that's all. What must be eliminated are these scandalous notebooks on which the children spend hours underlining, painting, and embellishing, as if in competition for an international exhibit. The beauty of these records has no connection with the quality of the work. The record should be done in class and if possible should be turned in at the end of the period.

A laboratory session should have a conclusion; since the pupils usually work in groups of two, one could write the results of each group on a blackboard as they are obtained. Then these results could be criticized, and the criticism immediately put to use. The groups which failed should begin again; the class looks for the mistake. At the end of the class there should be a collective discussion. The teachers' comments here are as important as at the beginning of the class.

Monsieur Lazerges has insisted in this article on the importance of laboratory exercises This idea is also discussed in an article by J. Huart, "Laboratory Exercises and the Teaching of Physics", which gives many examples of lab sessions and the application of the "rediscovery method".

The same Cahier includes an article by M. Ch. Brunold, Directeur General de l'enseignement du Second Degre, on the historic method in the teaching of sciences.

The second Cahier (no. 11, Jan. 15, 1059, 178 pp.) is composed of commentaries by many teachers. It represents a cross-section of opinion based on daily teaching experience, discussion, and frequently contradictory but always interesting comments. The teachers of physical science in the French secondary schools describe their methods, the changes they would like to see take place, their enthusiasms, and their worries. A great variety of subjects is discussed: the mentality of pupils, the rapid progress of science, the problems of teaching, continued training of teachers, advanced study, methods and details of teaching.

CAHIERS PEDAGOGIQUES, published by Le Comite Universitaire d'Information Pedagogique, available for distribution through S.E.V.P.E.N. 13 rue du Four, Paris 6. Editor: Fr. Goblot, 7 rue Jean-Marie Duclos, Lyon.

Issue no. 21 of the Cahier (April 15, 1060), is dedicated to the teaching of mathematics.

PROPOS SUR LA LANGUE FRANCAISE

QUELQUES ASPECTS DU VOCABULAIRE DE L'ENSEIGNEMENT *

L'école *primaire* ou école *communale*, ou encore, par ellipse, *La Communale*, est ainsi nommée parce qu'un loi du 28 Mars 1882 a ordonné qu'il y en ait au moins une dans chaque commune de France. On désigne aussi cette école au moyen des trois adjectifs *laïque, gratuite et obligatoire*, trois principes fondamentaux de l'enseignement primaire public posés par la même loi de 1882.

Le principe de la *gratuité* de l'enseignement primaire - devenu par la suite l'enseignement de *premier degré* - avait été établi comme corollaire du caractère obligatoire donné à cet enseignement. L'Etat voulait, par ce double moyen, combattre l'*analphabétisme* ou plutôt les résidus de l'*obscurantisme* dans lequel on accusait volontiers les hommes d'Eglise d'avoir volontairement maintenu les gens du peuple.

Anatole France a écrit, dans Le Petit Pierre , "de toutes les écoles que j'ai fréquentées, c'est l'*école buissonnière* qui m'a paru la meilleure et dont j'a le mieux profité"... Mais il n'est plus guère imité, et la *fréquentation scolaire* a beaucoup augmenté depuis soixante-quinze ans. Dans l'*enseignement secondaire* - ou, dans un langage plus administratif, du *second degré*, - qui est devenu gratuit à son tour, elle augmente même ces dernières années beaucoup plus vite que le nombre des professeurs et la capacité des bâtiments...

Quant au troisième principe, celui de la *laïcité* de l'enseignement public, qui découle du caractère *laïque* de l'Etat, il est difficile à un étranger de saisir tout ce qu'il réprésente. *Laïcité, laïque* sont des mots chargés de poudre; il suffit de les placer au contact de certains autres, de les introduire par exemple dans un texte de loi, pour provoquer une explosion... Si l'on s'en tient à la valeur objective des mots, *la laïcité de l'enseignement* est le principe au nom duquel la République, qui ne reconnaît officiellement aucun culte, s'abstient de tout enseignement religieux; son *personnel enseignant* est tenu de respecter la *neutralité scolaire*; mais il n'est pas interdit aux élèves de l'enseignement public de recevoir une instruction religieuse en dehors des heures de classe. D'où le congé du Jeudi, dont les Eglises peuvent disposer à leur gré.

A l'Ecole Primaire, il n'y a pas de *professeurs*: on dit le *Maître*. Le *professeur* trône dans les chaires du *supérieur* et du *secondaire*. Notre langage n'est pas avare du titre de *professeur*. Il l'accorde indistinctement au plus célèbre "pontife" titulaire d'une chaire en Sorbonne ou au Collège de France, à l'*agrégé de l'université* - qui n'est pas toujours un professeur d'université - et même au jeune *capessien* dont

* EXCERPTS FROM AN ARTICLE BY PAUL GILBERT APPEARING IN LA CLASSE DE FRANCAIS. NO. 5. 1958. PP 274-280.

le nom vient d'un calembour tiré du sigle C.A.P.E.S. (Certificat d'Aptitude au Professorat de l'Enseignement Secondaire). *Le Ministère de l'Education Nationale* ignore les *capessiens* et ne les connaît que sous le nom de *professeurs certifiés*.

Quant on s'adresse aux *professeurs*, on leur dit simplement "Monsieur", ou "Madame", voire "Mademoiselle". Les deux derniers cas deviennent, qu'on s'en réjouisse ou qu'on le regrette, de plus en plus fréquent... Mais le vocabulaire demeure un bastion solide de la virilité car ces dames ne veulent être ni des "professoresses", ni des "professeuses" ni des "professeures", au féminin. Faut-il dire "La *professeur* de mon fils est gentille" ou "Le *professeur* de mon fils est gentille"? Comme ni l'un ni l'autre solution ne peut satisfaire ceux qui respectent encore leur langue, on dit "*Le professeur de mon fils est une dame très gentille*"...

Instituteurs, que les élèves appellent *maîtres* (ils enseignent dans les classes primaires) et *professeurs* forment sans conteste la masse du *personnel enseignant*; mais il faut mentionner aussi les noms des *chefs d'établissements: directeurs* et *directrices* d'écoles primaires, *proviseurs* de lycées et *principaux* de collèges, etc... Plus haut encore dans la hiérarchie se placent les *inspecteurs primaires*, les *inspecteurs d'académie*, les *inspecteurs généraux*. Au point de vue de l'enseignement, la France est découpée en seize *académies*. A la tête de chacune d'elles un *recteur*, nommé par le *Ministre de l'Education Nationale*, contrôle tous les établissements d'enseignement, publics ou privés, des divers degrés, qui sont situés sur le territoire de *l'académie*. Le *recteur* est secondé par les *inspecteurs d'académie*, un par département.

L'ensemble du personnel enseignant constitue *L'Université de France* on dit aussi *l'université*, tout court, dont le *grand maître* est le Ministre de l'Education Nationale. Le mot *université* est donc chez nous beaucoup plus... universel que dans d'autres pays. C'est pourquoi l'expression *agrégé de l'université* ne désigne pas toujours un professeur qui enseigne dans une université. En principe, l'*agrégation* est un *concours de recrutement* pour l'enseignement secondaire. En somme, un *universitaire* est un membre de ce qu'on appelait naguère *le corps enseignant* ou *le corps professoral*, de même que l'on dit *le corps médical* ou *le corps diplomatique*. Aujourd'hui on réserve cette tournure pour les circonstances solennelles et on la remplace dans l'usage quotidien par le collectif *les enseignants*.

STATISTICAL INFORMATION

Statistics for the school year 1958-59 have now been completed and verified by the B.U.S. (University Bureau of Statistics, 29 rue d'Ulm, Paris 5e).
We publish extracts from issue No. 20, April, 1960, of their publication "Informations Statistiques". In this issue we are also publishing statistics on enrollment in the science courses. See Charts 2 and 3.

BACCALAUREAT EXAMINATION

This traditional examination preliminary to entrance in French Universities was modified by law August 31, 1959 (See Education in France, No. 8). These figures refer to the last academic year when the former system was in effect. A new system was tried out in 1959-60, and will probably undergo further changes.

The old system was criticized for being too selective. It is hoped that further reforms will allow a greater percentage of success and yet preserve the prestige of the degree and the high standards of general knowledge that are traditionally associated with the old Baccalauréat.

Chart 1.

BACCALAUREAT EXAMINATIONS - School year 1958-59

	First part (all divisions) (1)		Second part (all divisions)	
	Boys	Girls	Boys	Girls
June session:				
Candidates registered:	59 853	52 237	41 804	36 013
Candidates taking test:	58 132	51 246	40 560	35 000
Candidates passing:	21 691	20 078	15 892	14 862
September session:				
Candidates registered:	26 738	23 718	25 723	20 755
Candidates taking test:	25 468	22 582	23 967	18 979
Candidates passing:	10 361	9 384	9 338	9 007
All Sessions:				
Total passed:	32 052	29 462	25 230	23 871
	total: 61 514		49 101	
Total passed compared to total registered in June:				
% of success:	53%	56%	60%	66%
	total: 55%		63%	

(1) THE FIRST PART IS TAKEN AT THE END OF THE SIXTH YEAR IN HIGH SCHOOL. THE SECOND PART AT THE END OF THE SEVENTH YEAR. THE REGULAR SESSION IS HELD IN JUNE: ALL CANDIDATES ATTEND. HOWEVER, UNTIL NOW, THOSE FAILING HAD A 'SECOND CHANCE' IN SEPTEMBER.

Chart 2.

SCHOOL YEAR 1958-59

Enrollment in French Universities, from June 30, 1959

Universities	Number of students											
	Continental France			Students from overseas member countries of the Community (1)			Foreigners			Totals		
	men	women	Total	men	women	Total	men	women	Total	men	women	Total
Paris	34 719	23 902	58 621	2 369	945	3 314	5 821	2 782	8 603	42 909	27 629	70 538
Aix	7 395	4 755	12 150	385	75	460	327	156	483	8 107	4 986	13 093
Alger	3 347	1 919	5 266	626	77	703	50	8	58	4 023	2 004	6 027
Besançon	1 278	833	2 111	12	3	15	37	2	39	1 327	838	2 165
Bordeaux	6 244	3 632	9 876	267	77	344	892	169	1 061	7 403	3 878	11 281
Caen	3 107	1 909	5 016	107	6	113	157	33	190	3 371	1 948	5 319
Clermont	2 005	1 579	3 584	42	5	47	33	24	57	2 080	1 608	3 688
Dijon	1 644	1 203	2 847	89	9	98	88	74	162	1 821	1 286	3 107
Grenoble	3 865	2 009	5 874	187	52	239	584	386	970	4 636	2 447	7 083
Lille	6 849	3 486	10 335	36	10	46	122	82	204	7 007	3 578	10 585
Lyon	6 247	3 938	10 185	99	12	111	312	73	385	6 658	4 023	10 681
Montpellier	4 284	3 161	7 445	518	113	631	734	148	882	5 536	3 422	8 958
Nancy	4 171	2 288	6 459	47	5	52	216	62	278	4 434	2 355	6 789
Poitiers	3 196	2 250	5 446	153	20	173	168	90	258	3 517	2 360	5 877
Rennes	6 346	3 351	9 697	103	13	116	110	27	137	6 559	3 391	9 950
Strasbourg	4 241	2 065	6 306	79	10	89	383	101	484	4 703	2 176	6 879
Toulouse	5 660	3 504	9 164	324	49	373	492	79	571	6 476	3 632	10 108
Totals	104 598	65 784	170 382	5 443	1 481	6 924	10 526	4 236	14 822	120 567	71 561	192 128
(1) Students coming from associated states (Cambodia, Laos, Vietnam) and the former Protectorates (Morocco, Tunisia) are counted with the foreign students.												
Université de Dakar	238	143	381	848	54	902	30	2	32	1 116	199	1 315
	381			902			32			1 315		

Chart 3.

STUDY OF SCIENCES

Number of students by universities, sex and nationality, June 30, 1959

Universities	Number of students											
	Continental France			Students from overseas member countries of the Community			Foreigners			Totals		
	H	F	Total	H	F	Total	H	F	Total	H	F	Total
Paris	11 045	6 113	17 158	638	194	832	898	170	1 068	12 581	6 477	19 058
Aix	2 768	1 371	4 139	105	19	124	89	7	96	2 962	1 397	4 359
Alger	1 087	455	1 542	100	16	116	4	–	4	1 191	471	1 662
Besançon	906	386	1 292	6	–	6	30	–	30	942	386	1 328
Bordeaux	2 124	1 055	3 179	82	28	110	130	4	134	2 336	1 087	3 423
Caen	1 227	578	1 805	35	2	37	69	3	72	1 331	583	1 914
Clermont	1 074	578	1 652	16	1	17	11	5	16	1 101	584	1 685
Dijon	607	338	945	72	2	74	18	1	19	697	341	1 083
Grenoble	2 308	588	2 896	50	5	55	166	6	172	2 524	599	3 123
Lille	2 852	878	3 730	8	–	8	20	4	24	2 880	882	3 762
Lyon	2 292	981	3 273	25	1	26	83	9	92	2 400	991	3 391
Montpellier	1 395	789	2 184	126	22	148	175	39	214	1 696	850	2 546
Nancy	1 727	550	2 277	10	1	11	79	3	82	1 816	554	2 370
Poitiers	1 174	493	1 667	35	3	38	29	5	34	1 238	501	1 739
Rennes	3 025	1 014	4 039	33	3	36	52	1	53	3 110	1 018	4 128
Strasbourg	1 420	570	1 990	27	4	31	85	10	95	1 532	584	2 116
Toulouse	2 720	1 048	3 768	126	8	134	168	13	181	3 014	1 069	4 083
Totals	39 751	17 785	57 536	1 494	309	1 803	2 106	280	2 386	43 351	18 374	61 725
	57 536			1 803			2 386			61 725		
Dakar	75	43	118	164	8	172	6	1	7	245	52	297
	118			172			7			297		

Distribution of students from overseas members of the community, classed by country of origin, June 30, 1959

Issue No. 9 of Education in France was devoted to French education in the African countries of the "Communauté". The following figures will furnish some additional information on French-African education. They give the exact number of students from the "Communauté" enrolled in France's continental universities. In comparison, the number of students enrolled in African French universities during the same year (1058-1059) was: Algiers, 6027; Dakar, 1315.

Chart 4.

Country of origin	Number of students												
	Law		Sciences		Literature		Medicine		Pharmacy		Totals		
	H	F	H	F	H	F	H	F	H	F	H	F	Total
Department of Algeria	605	76	635	126	464	347	610	103	148	67	2 462	719	3 181
Overseas Departments													
Guadeloupe	68	17	86	26	35	44	115	20	18	9	322	116	338
Guyane	14	9	6	8	8	6	14	3	4	2	46	28	74
Martinique	68	18	74	45	46	37	99	34	16	23	303	157	460
Réunion	6	-	28	16	4	13	30	11	11	13	79	53	132
Overseas territories													
Comores	1	-	-	-	-	-	7	4	-	-	8	4	12
Côte Franç.des Somalis	1	-	-	-	-	-	2	1	-	-	3	1	4
Polynésie Française	2	-	2	1	-	-	3	-	-	-	7	1	8
St-Pierre et Miquelon	-	-	-	-	-	2	1	1	-	-	1	3	4
Nlle Calédonie	9	2	7	3	4	6	24	3	-	1	44	15	59
States of the Community													
Républ. Centrafricaine	15	4	3	-	2	-	10	3	-	-	30	7	37
- Congo	22	-	16	2	41	6	8	3	-	-	87	11	98
- Gabonaise	13	2	14	2	2	1	7	4	2	-	38	9	47
- Tchad	6	1	4	-	9	4	5	1	-	-	24	6	30
- Côte d'Ivoire	121	1	47	2	8	-	40	4	21	4	237	11	248
- Dahomey	52	4	38	-	28	11	20	4	2	1	140	20	160
- Hte Volta	10	-	8	1	11	4	10	-	4	1	43	6	49
- (Islamique de (Mauritanie	5	-	5	-	4	-	2	-	-	-	16	-	16
- Niger	9	2	13	1	4	-	8	1	-	-	34	4	38
- Sénégal	97	3	73	4	26	18	23	9	8	-	227	34	261
- Soudan	38	-	62	2	23	16	14	2	3	-	140	20	160
- Malgache	231	22	175	42	39	38	115	46	14	13	574	161	735
The Cameroon	116	1	98	4	51	15	59	9	15	4	339	33	372
Togoland	37	4	45	4	19	1	15	7	6	3	122	19	141
CONDOMINIUM (Nlles Hébrides)	-	-	2	-	-	-	1	1	-	-	3	1	4
Unspecified	58	12	53	20	2	-	5	7	1	3	119	42	161
Totals	1604	178	1 494	309	830	569	1 247	281	273	144	5 448	1 481	6 929
	1 782		1 803		1 399		1 528		417		6 929		

RELATION BETWEEN ENROLLMENT IN PUBLIC AND PRIVATE SECONDARY SCHOOLS (1) AND THE POPULATION BETWEEN 11 AND 17 YEARS OF AGE, BY DEPARTMENT. SCHOOL YEAR 1958-59.

It has become standard in all countries to measure the level of scholarization of various degrees on a scale, in order to determine the percentage of the educatable population attending school. This percentage is a coefficient which is called "level of scholarization."

The following tables show the rate of scholarization in the public and private secondary schools by department. This information is valuable since the margin of error is relatively unimportant.

The level of scholarization in public and private schools:

Considering the public and private secondary schools taken together, some very important variations in percentages will be noted. The highest percentage is 70.2% in the Maritime Alps, the lowest is 18.2% in the Loir-et-Cher.

Nine departments show a percentage above 50%: the Maritime Alps - 70.2%, Seine - 61.4%, Bouches-du-Rhône - 55.8%, Haute-Garonne - 55.2%, Seine-et-Oise - 55.2%, Hautes-Pyrénées - 55.1%, Var - 54.9%, Hérault - 54.3%, Savoie - 50.1%.

Ten departments show percentages under 25%: Aube - 24.9%, Indre - 24.9%, Eure-et-Loire - 24.8%, Gers - 24.7%, Eure - 24.3%, Somme - 24.1%, Deux-Sèvres - 23.2%, Vendée - 22.2%, Mayenne - 18.9%, Loir-et-Cher - 18.2%.

In eight departments, the percentage is between 50 and 45%, in twelve, between 45 and 40.1%, in seventeen, between 40 and 35%, in seventeen more, between 35 and 30.1%, in the remaining seventeen between 30 and 25.1%.

If France were to be divided into two parts: 45 departments to the north and to the south of a line from La Rochelle to Besançon, of the ten departments with the greatest level of scholarization, eight

(1) SECONDARY SCHOOLS INCLUDE: PUBLIC EDUCATION: THE LYCEES AND THE COLLEGES, THE NATIONAL PROFESSIONAL SCHOOLS, TECHNICAL COLLEGES, TECHNICAL SECTIONS OF LYCEES AND COLLEGES, TRADE SCHOOLS, FULL TIME APPRENTICESHIP CENTERS, SUPPLEMENTARY COURSES INCLUDING THOSE WITH SPECIALIZED SECTIONS. PRIVATE EDUCATION: SECONDARY SCHOOLS, TECHNICAL SCHOOLS, AND SUPPLEMENTARY COURSES. NOT INCLUDED IN THE ENUMERATION ARE 'POST-SCHOOL' AGRICULTURAL EDUCATION, APPRENTICESHIPS IN TRADE (ARTISANS) AND MILITARY PREPARATORY SCHOOLS.

are in the southern half and two in the northern half: of the twenty departments with the highest percentage, sixteen are in the south and four in the north; and of the thirty departments with the highest percentage, twenty-six are in the south and four in the north.

Consequently the departments in the central region, the south and the south-west have the highest levels of scholarization. What are the reasons for this?

In order to answer this question it would be necessary to make a careful study in each department of a whole series of factors: for example, the school systems, the type of economic conditions, the socio-professional structure of the population, the level of income, the nature and the importance of local job opportunities, etc.

The level of scholarization in public and private schools taken separately: considering secondary private and public school education separately, the private schools show a rate of 10%, the public schools 28.9%.

In twelve departments, 40% of the population from 11 to 17 is educated in public schools, in nineteen departments, 30 to 40%, in fifteen departments, 25 to 30%, in twenty-seven, 20 to 25%, and in seventeen, less than 20%.

In twelve departments, 40% of the population from 11 to 17 is educated in public schools, in 19 departments, 30 to 40%, in 15 departments, 25 to 30%, in 27, 20 to 25%, and in 17, less than 20%.

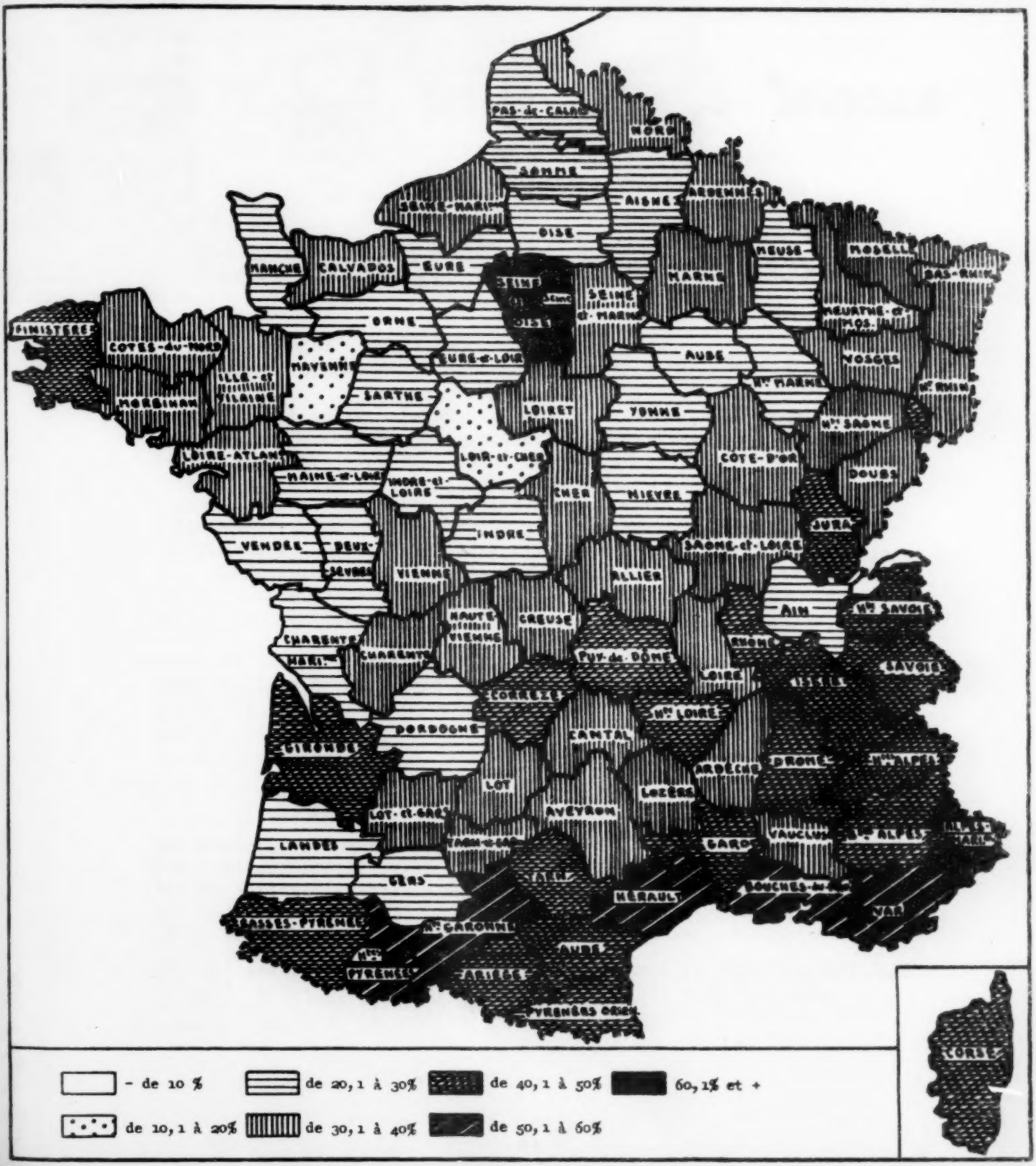
In only two departments is the level of private education higher than 20%: La Haute-Loire and le Finistère. It is between 12 and 20% in nine departments, 10 and 15% in eighteen departments, between 5 and 10% in 47 departments, and less than 5% in fifteen departments.

In three departments only is the rate of private education higher than the rate of public education: Haute-Loire, Vendée and Maine-et-Loire. In two departments it is equal for private and public education: Loire Atlantique and Ille-et-Vilaine. The west of France and the south-east region of the Massif-Central are the areas in which private education contributes most to the rate of scholarization on the secondary level.

RAPPORT ENTRE LES EFFECTIFS SCOLARISES DANS LES ETABLISSEMENTS DU NIVEAU DU SECOND DEGRE ET LA POPULATION AGEE DE 11 A 17 ANS

- PAR DEPARTEMENT -

Enseignements Public et Privé — Année scolaire 1958-1959



recent books and audio visual material

BOOKS ON SCIENCE EDUCATION

ENGINEERING SCHOOLS IN FRANCE: by Pierre Morel. *Since the French and American systems of education differ so markedly, misunderstandings often arise concerning the equivalent value of degrees. This work of M. Morel's was written with the purpose of explaining the training given in the "Grandes Ecoles", the selection of candidates, and various statistics concerning the kinds of engineering specialties offered. 82 pages.* **Edited and published by the Cultural Services of the French Embassy, 972 Fifth Avenue, New York 21, N.Y. (Available for free distribution)**

LE METIER D'INGENIEUR: P. Pillot. *Former students of L'Ecole Nationale d'Ingenieurs des Arts et Métiers, under the direction of P. Pillot, have prepared this book which discusses various aspects of the engineer's career and training.*

LE DICTIONNAIRE MATHEMATIQUE DU TECHNICIEN: by R. Cluzel. *This small book is one of a series of memory aids for technicians and students in technical schools. It contains tables of mathematics, algebraic equations- calculus logarithmns, plane and solid geometry, and trigonometry. A very useful volume for those who like mathematics or use it in their work.* **Delagrave, Paris.**

ELECTROMAGNETISME: by Emmanuel Dubois. *M. Dubois approaches the problem of magnetism from the theory of electric currents rather than from the out-moded concept of magnetic fluids. His work will be*

particularly useful to secondary school teachers when they begin dealing with this subject in their classes, especially in utilizing the MKSA system and in studying magnetic induction. **Librairie Delagrave.**

L'ASPECT MODERNE DES MATHEMATIQUES: by Lucienne Felix. *This book begins with a sketch of the evolution of mathematical thought and indicates the relationship of this development with that of the arts and natural sciences. The two following chapters are devoted respectively to the formal aspects of mathematics and the great subdivisions within the subject itself. The last chapter discusses the teaching of mathematics.* **Librairie scientifique Albert Blanchard.**

INTRODUCTION A LA LOGIQUE CONTEMPORAINE: by Robert Blanche. *In this philosophic work the author discusses the teaching of sciences from the viewpoint of the transformation from formal classic logic to the mathematical logic of the present day.* **Armand Colin.**

LE MATERIEL POUR L'ENSEIGNEMENT DES MATHEMATIQUES: Commission internationale pour l'étude et l'amélioration de l'enseignement des mathématiques. *Ten specialists representing seven countries collaborated in the editing of this volume, which gives information on methods and materials for the teaching of modern mathematics.* **Delachaux et Niestlé.**

GUIDE THEORIQUE ET PRATIQUE DE LA RECHERCHE EXPERIMENTALE: by René Leclercq. *In this book the author explains many of the lessons he learned in his years as a research scientist. He discusses such subjects as the human element in research and the role of the research scientist in contemporary society.* **Gauthiers-Villars.**

PETIT LEXIQUE DE L'ENERGIE ATOMIQUE: by Henry Piraux. *With the advent of nuclear research a whole new list of words has been added to the scientific vocabulary. This book lists 700 of them with definitions which constitute a fair summary of information on nuclear energy and radioactivity.* **Eyrolles.**

MATHEMATIQUE ET MATHEMATICIENS: by Pierre Dedron and Jean Itard. *This volume, presenting a history of mathematical theory and theorists, is the latest in an excellent series* **(PHYSIQUE ET PHYSICIENS and CHIMIE ET CHIMISTES by R. Massain).** *Since it deals with "elementary" mathematics, it stops with the beginning of the nineteenth century. This limitation does not make the book less interesting for the reader, however, for the authors have succeeded admirably in presenting the excitement of the mathematical adventure of discovery.* **Magnard.**

MAGAZINES DEVOTED TO THE TEACHING OF SCIENCE

THE TEACHING OF SCIENCE

This review appears five times a year and is addressed to teachers of science. It keeps them up-to-date on latest advances and furnishes opportunities for the exchange of ideas on methods and disciplines. The presentation is attractive, the style clear and not overly technical. There is a nice balance between articles of exclusively technical interest, such as "Macromolecular chemistry and its applications", and more general subjects, such as "The teaching of the Sciences and Humanism" or "Youth and Science". This magazine will be pleasant and profitable reading to anyone interested in science and in teaching. It is published by the Editions Scientifique, HERMANN, 115 Bd. St. Germain, Paris 6e.

L'ECOLE, ENSEIGNEMENT SCIENTIFIQUE - First Cycle - Second Cycle.

This small monthly review contains examples of problems or of course material taken from secondary school class programs. The "Premier Cycle" section is devoted to the sixth, fifth, fourth and third classes, the "Second Cycle" is devoted to the second, first and terminal classes, including examples of questions asked on the Baccalauréat examination. These sections give exact information on the programs, methods and types of problems used in the teaching of science and mathematics in the French secondary school system. Of interest mainly to teachers. 11, rue de Sèvres, Paris 6e.

TECHNIQUE, ART, SCIENCE

This monthly review of technical education, which is very well presented, discusses both general and particular problems of technical education in France and abroad. As the title indicates, the problems of scientific education are discussed not only for their own sake, but in relation with other aspects of education. M. L. Peyrègne, Secrétaire Général, 110 rue de Grenelle, Paris 7e.

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The Minister of Foreign Affairs has published a REPERTOIRE DES GRANDES ECOLES ET DES ETABLISSEMENTS FRANCAIS D'ENSEIGNEMENT TECHNIQUE for the benefit of foreign students. It is a list of those specialized schools, other than universities, which provide education on the level of the Baccalauréat and higher. All the scientific schools are listed, and for each school the address, the qualifications for admission, the subjects offered, the examination material, and the degrees granted are given. LA DOCUMENTATION FRANCAISE, 14-16 rue Lord Byron, Paris 8e.

AMERICAN BOOK

The National Science Foundation has just published Statistical Handbook of Science Education (NSF-60-13), a compilation of statistical material on the education and training of scientists and engineers in the United States. It should prove to be a useful reference work for anyone interested in science and engineering education in the U. S. Copies may be obtained from the Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C., at a price of 55 cents.

* * *

BOOKS ON EDUCATION

L'EDUCATEUR ET LA METHODE DES TESTS: by Gaston Mialaret. *For the last several years the problem of educators' use of testing methods has been widely discussed. M. Mialaret's book, "The Educator and Testing Methods" makes a valuable contribution to the study of this problem. Using many examples the author presents a general background in the purposes and techniques of testing and the statistical method.* Les Editions du Scarabee. 3 rue de la Montagne-Saint-Geneviève, Paris 5e.

EXERCICES PERCEPTIFS ET SENSI-MOTIERS: by J. Dubusson. *This manual contains a series of training exercises to develop the perceptual skill of small children and handicapped children. These exercises are intended to increase attention, to develop observation, and to train the memory and reasoning of the child.* Delachaux et Niestlé, 32 rue de Grenelle, Paris 7e.

MANUEL POUR L'EXAMEN PSYCHOLOGIQUE DE L'ENFANT: by René Zazzo. *M. Zazzo, director of the child's psycho-biology laboratory at l'Ecole des Hautes Etudes and the psychology laboratories at the Henri Rousselle Hospital, has written an excellent manual covering various psychological tests for children, including graphs, diagrams, statistical information and interpretation.* Delachaux et Niestlé, 32 rue de Grenelle, Paris 7e.

L'INADAPTATION SCOLAIRE ET SOCIAL ET SES REMED ES: L'ACTION DES CENTRES PSYCHO-PEDAGOGIQUES DES ETABLISSEMENTS D'ENSEIGNEMENT: by Georges Mauco. *The unadjusted child who is physically and mentally normal is the subject of this book. The author discusses psychotherapy, the psychodrama, and various other techniques and methods to aid the social and scholastic adjustment of the disturbed child.* Editions Bourrelier, 55 rue Saint-Placide, Paris.

LES DROITS DE L'ENFANT: by Jean Chazal. *Jean Chazal, honorary president of the International Association of Juvenile Court Judges, devoted his life to helping young offenders and improving understanding of juvenile delinquency. The present book contains articles on such subjects as the child and his rights, the abandoned child, the mistreated child, the child in moral danger, the rebellious child, and the child whose custody is disputed. 118 pages.* **Presses Universitaires de France, 108 Bd. St. Germain, Paris 6e.**

JEUNESSE, FAIT SOCIAL MECONNU: by Jean Jousselin. *M. Jousselin discusses the problems of the adolescent in today's society and proposes certain possible solutions. A valuable work for educators.* **PUF (Collections Nouvelles Recherches), 108 Bd. St. Germain, Paris 6e.**

L'EDUCATION DU TRAVAIL: by C. Freinet. *M. Freinet discusses the necessity of a well-organized system of education based on work rather than on some vague and well-meaning theory of love or kindness towards the student. He says: "... I hope to see a regeneration brought about by a better organization of work as the heart of the scholarly community, a cell in the social community."* **Editions Delachaux et Niestlé, 32 rue de Grenelle, Paris.**

GUIDE PRATIQUE POUR L'ENSEIGNEMENT DE L' ORGANISATION DE L'ORTHOGRAPHE: by N. Lambotte, F. Cousin. *A helpful and well-organized work on spelling usage which should be in all secondary school libraries on the same shelf as the dictionary. 166 pages.* **Desforges, 29 quai des Grands-Augustins, Paris 6e.**

LES MATERNELLES: by Ida Berger. *Mme Berger, "Attachée de Recherches au CNRS", has written a sociological study of nursery school teachers in the Seine area. She studies them especially from the viewpoint of the profession and economic status of the parents, of the husband, and as far as possible, of the nursery school teachers' children. 196 pages.* **Centre National de la Recherche Scientifique, 13 quai Anatole France, Paris 7e.**

POSSIBILITES D'ACCES A L'EDUCATION DANS LES ZONES RURALES: ETUDE COMPARFE: *Based on the replies of 71 countries to a questionnaire organized by the International Education Bureau, this study is devoted to the administration of rural schools, their organization, their study systems, and teaching personnel. It shows that only in the relatively highly developed countries (representing only about a third of the world's population) is the rural child offered an education equivalent to that of the city child. This book permits a comparison of the various countries' methods of dealing with this problem. 254 pages.* **Paris, UNESCO, Geneva, Bureau International d'education. Publication No. 191, 1958.**

FRENCH ROUNDABOUT: by Claire Huchet Bishop. *This book which presents tourist and historic information, is written in the form of a teenager's novel. Mrs. Bishop shows us Blanche and Bob, two teenagers who are traveling in France, receiving, naturally, all sorts of valuable and interesting information, which Mrs. Bishop skillfully intertwines with the plot, slyly pointing up subtle differences between France and the United States. If, however, this book was intended for young teenagers, it may be that Mrs. Bishop has underestimated the sophistication of her audience.* Dodd, Mead and Company, 432 Fourth Avenue, New York.

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SPECIAL ISSUES OF PEDAGOGICAL MAGAZINES

LA CLASSE DE SIXIEME - ENFANCE, No. 1, 1960.
Director: Doctor Henri Wallon, honorary professor of the Collège de France.

The "sixth" is the first year of secondary education, which consists of seven years of study in the lycées, in preparation for the Baccalauréat, and of four years of study in the Cours Complémentaires, in preparation for various specialized schools.

Pupils must pass a qualifying examination over what they learned in elementary school before entering the "sixth", and they must be eleven or twelve years old. The "sixth" class poses a serious orientation problem: the teachers and the parents must decide if the child is capable of preparing himself for the Baccalauréat and the University, and if the answer is yes, if he would benefit more from a "classic" section (Latin required) or a "modern" section (no Latin). Of course the child may change his plans after the "sixth" and change to a university preparatory section, but this is difficult and it is better if the correct choice is made in the "sixth".

The change from elementary to secondary school also poses psychological questions. All these points are explained and discusses in this brochure of 119 pages: Selection, Orientation, and Adaptation are the principal themes.

Enfance, 41 rue Gay-Lussac, Paris 5e. Five issues a year.

CAHIERS PEDAGOGIQUES, No. 16, November 15, 1959 - a monthly magazine devoted to secondary education.

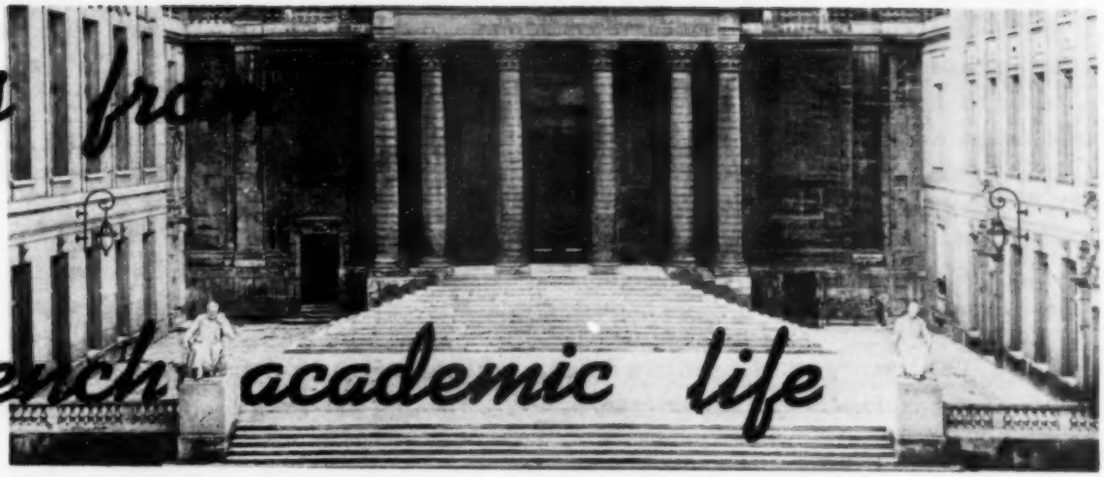
Enseignement Secondaire et Enseignement Technique.

Technical instruction is the most complex aspect of French education. This term applies to professional schools, apprenticeship centers, certain technical schools, technical colleges, certain secondary schools which prepare the student for the technical Baccalauréat, the most difficult section of the Baccalauréat, and the engineering schools.

Technical education is more utilitarian in spirit than secondary education, although it too attempts to form the character of the student, and to give him a humanistic and cultured education as well as a trade. The philosophy of these two types of education, a comparison of their students, the change from technical to secondary or vice versa, differences in methods, problems of organization, all these topics are comprehensively discussed in this little 143 page book. Also there are included tables, examples and statistical information. This publication will be very helpful as an aid to understanding the subtleties of the French system of secondary education. Comité Universitaire d'Information Pédagogique, S. E. V. P. E. N., 13, rue du Four, Paris 6e.

School for orphans around 1850

news from french academic life



A new "Grande Ecole" of Public Health: Objective: to integrate particular medical techniques with social ones.

A French-speaking person, wishing to become a doctor for the World Health Organization and to receive an appointment as a technical aid must take courses in order to receive the necessary training... at Montreal.

This situation is being corrected by a project of a recent law authorizing the Minister of Public Health to create a National School of Public Health at Rennes.

Emphasis on intellectual leadership: in a presentation of the purposes of the project, recently submitted to the Superior Council of National Education, it was indicated that the establishment of such an institution would accentuate the intellectual, scientific, and technical influence of France at a moment when the countries of the Community, the independent states of French background, and various foreign countries have a need for men and women with this kind of international training. The need is equally great in France itself. The development of an efficient social and hygiene policy requires highly specialized personnel.

Students of varying backgrounds and training: the school of public health, now a section of the National Hygiene Institute, which gives instruction to hospital and government administrators, will be integrated into the new establishment. The new "Grande Ecole" will have to receive students of very different backgrounds - French, foreign and community doctors and technicians - and the teaching will have to be flexible and varied. The diploma will be internationally recognized.

Teaching Science in a Scientific Age

The current of opinion : stop adding on to the programs - change the basic meaning of instruction.

"L'Organisation économique de la Communauté Européenne" this spring organized a conference on Scientific Education in a Scientific Age. The economic future of a nation in our times depends on its scientists. In order to prepare the economy for tomorrow it is necessary that today there be a system of education providing for their training. Certainly, as is always true of international conferences, it is not a question of making final decisions. Since, however, all the secondary school administrators were present and in agreement, the basic structure of all European scientific education was to that extent organized.

The same problems have arisen everywhere. Science is evolving so quickly that the programs, in attempting to keep up, run the risk of becoming overcrowded. Is it possible to continue adding new subjects without having to curtail traditional material? Is it necessary to teach 19th century physics as well as contemporary physics? Or should recent discoveries made in the universities be ignored? This would be ridiculous. In our era, science has a whole new basis, and education in the schools should be in contact with these new concepts, and not detached from the living world of science. Would it not be better to reject the whole present approach and, using modern methods, build a more logical pedagogical system?

Local differences in educational needs: these are questions which concern every family and every country. The problems are, however, different for certain countries. Turkey, for example, must start building practically from scratch, and of course she wishes to profit from the experience of others. Some countries, on the other hand, which are organized on a federation system, have no power to impose their methods and programs on their educational establishments.

There are four committees responsible for various aspects of the problem:

1) to study the need for teachers
2) scholarly orientation toward science
3) the use of equipment and pedagogical materials
4) improvement of the programs, incorporating more experimental methods.

Training teachers in the new methods

In the future it seems certain that the tendency will be away from teaching science as a catalogue of "faits accomplis", and will be instead towards an attempt to inculcate ways of thinking, using facts simply as examples. But a high level decision is incapable of bringing about such a reform. "In training teachers to the new methods, and convincing them that a revitalized pedagogy is well founded, the greatest effects will be achieved", said M. Charles Brunhold.

In other words, although in France the school year beginning in October will witness a new approach in this field, it can only be a question of a progressive evolution.

Documentation Bureau for French Teachers

(Excerpts from an article by Philippe Reybeyrol)

"Among the problems posed by efforts to introduce French in various parts of the world, the one which interests me most at the present time is that of establishing a new pedagogy of French, adapted to the needs of foreign countries and employing modern methods. The Association pour l'Etude des Moyens d'Enseignement et de Diffusion de la Langue Française has been formed in collaboration with the Minister of National Education, with this problem in mind.

The Bureau d'Etude et de Liaison pour l'enseignement du français dans le monde is the permanent technical section of this association. It is composed of a small number of specialists in linguistic and pedagogical problems, and its objectives are:

1) to assemble complete documentation on methods and techniques of teaching French around the world, to analyze these documents, and to establish a center of pedagogical information for foreign teachers.

2) to develop methods of adapting the teaching of French to the particular needs of countries, and to suggest programs and systems for various types and levels of students.

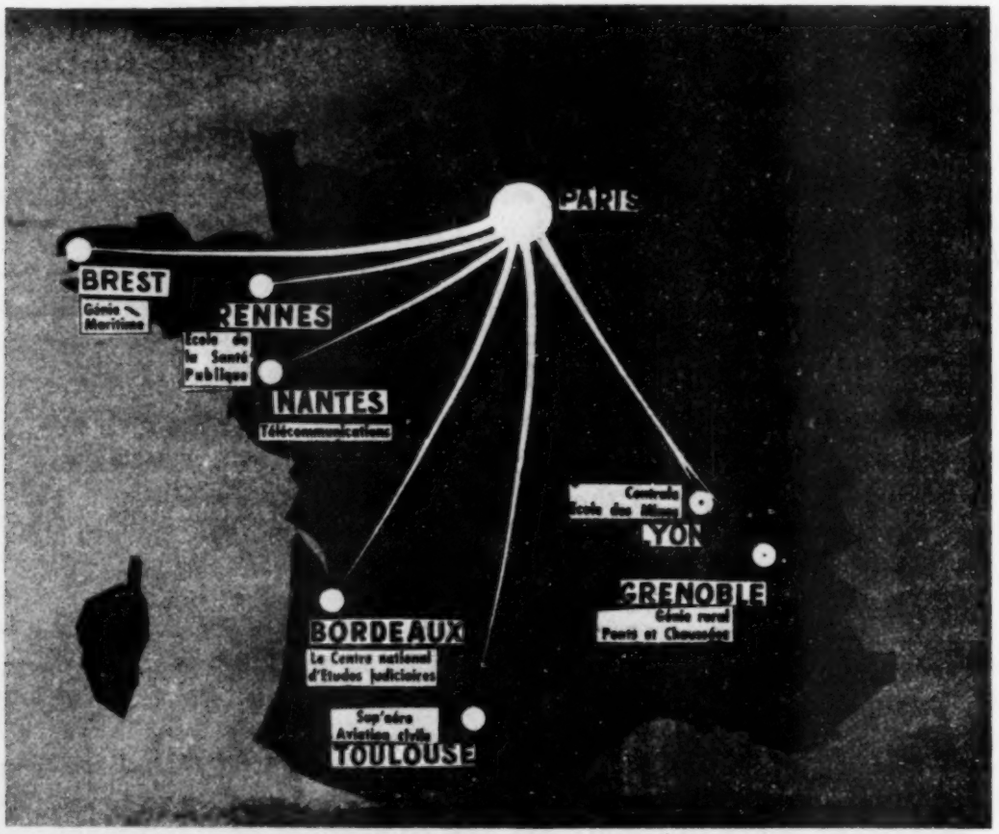
3) to coordinate and encourage the study, development and realization of methods, and the study and production of pedagogical materials.

4) to contribute, in coordination with the Ministry, to the training of teachers before their departure, to the improvement of those already teaching, and to the training of foreign teachers.

5) to distribute this information by means of brochures, publications, etc., and to establish an exchange of ideas between teachers and the bureau.

The object of this bureau is obviously not to replace those instructors who are in contact with local realities and are able to improve their methods and equipment, but rather to help orient them in their efforts and furnish technical information. The center of documentation will be established soon, as a part of the activities of the Bureau of Study, to furnish assistance to foreign teachers of French. Teachers who would be interested in sharing their experiences and their problems, or in documentation, are invited to get in contact when in Paris with:

Le Bureau d'Etude et de Liaison, 13 rue du Four, Paris 6e."



These schools will be moved from Paris to other university towns.

FACULTE DES LETTRES ET SCIENCES HUMAINES DE L'UNIVERSITE DE PARIS
(University of Paris, School of Arts)

DOCTORAT D'ETAT:

Doctorat d'Etat: a prerequisite to teaching in French universities. Years of preparation and the contribution of a really significant thesis and a complementary shorter thesis are required for this degree. American students wishing to become candidates for the State Doctorate in Letters, Science or Law, must possess an M.A. or M.S. degree or its equivalent from an accredited American college, university, or technical school of good standing.

The following are the theses presented for DOCTORAT ES LETTRES, or State Doctorate in Arts:

May 6, 1960. Jean BOURRILLY
Principal Thesis: "The Youth of Jules Slowacki (1809-1833), his Life and Works"
Complementary Thesis: "Balladyna, a Tragedy in five acts by Jules Slowacki. Annotated translation preceded by an introduction."

May 7, 1960. Gilbert DURAND
Principal Thesis: "Anthropological Structures of the Imaginary - An Introduction to General Archetypology"
Complementary Thesis: "The Mythical Décor of La Chartreuse de Parme - a Contribution to the Esthetic of the Romantic"

May 14, 1960. Fernand JOLY
Principal Thesis: "Study of Topography of South-East Morocco"
Complementary Thesis: "A Chart showing the Utilization of Soil in Morocco. - Application of the Cartographic Method to the Study of Geographic Regions."

May 21, 1960. Anne-Marie MALINGREY
Principal Thesis: "Semantic Study of Words of the family in the Greek Christian Literature of the First Four Centuries"
Complementary Thesis: "Jean Chrysostome - On the Providence of God, Introduction, Critical Text, Translation and Notes"

May 24, 1960. Charles Le CHEVALIER
Principal Thesis: "Confession and the Human Personality"
Complementary Thesis: "The Moral Thought of Bernard Bosanquet (1848-1923)"

May 28, 1960. Jean LAURENT
Principal Thesis: "Pharmacy in France, a study of Economic Geography"
Complementary Thesis: "Economic Divisions in France - a Map Summary"

May 31, 1960. Marcel LESNE
Principal Thesis: "The Evolution of a Berber Group: The Zemmour"
Complementary Thesis: "History of a Berber Group. The Zemmour"

June 2, 1960. Robert MAUZI
Principal Thesis: "The Idea of Happiness in French Literature and Thought of the 18th Century"
Complementary Thesis: "Madame du Châtelet - Reflections sur le Bonheur . Annotated Critical Edition."

June 4, 1960. Yvon BELAVAL
Principal Thesis: "Leibniz, Critic of Descartes"
Complementary Thesis: "Leibniz, the Philosopher's Confession of Faith (Confessio Philosophi). Presentation, Translation and Notes."

June 6, 1960. René TAVENEAUX
Principal Thesis: "Jansenism in Lorrain (1640-1789)"
Complementary Thesis: "The Jansenists and the Interest Loan. - Chosen Texts, Introduction and Notes"

June 11, 1960. Gilbert LAZARD
Principal Thesis: "The Language of the oldest documents in Persian prose"
Complementary Thesis: "The earliest Persian poets - 1Xth and Xth centuries - Different pieces gathered, translated and published"

June 23, 1960. Max MILNER
Principal Thesis: "The Devil in French Literature from Cazotte to Beaudelaire (1772-1861)"
Complementary Thesis: "Honoré de Balzac - Massimilla Doni. Critical Edition with Introduction, Music and the Text of the original manuscript"

June 25, 1960. Paul BLOIS
Principal Thesis: "Peasants in Western France (the Sarthe) - Economic and Social Structures Leading to Political Options since the Revolutionary Epoch"
Complementary Thesis: "Complaint Notebooks of the Third Estate of the Château-du-Loir Assembly in the Estates General of 1789"

June 27, 1960. Jean MOUROT
Principal Thesis: "Chateaubriand - rhythms and sounds in Les Mémoires d'Outre-Tombe - genius of style"
Complementary Thesis: "Studies on the earlier works of Chateaubriand: Tableau de la Nature - Essai sur les Révolutions

June 30, 1960. Rolf Alfred STEIN
Principal Thesis: "Research on epic and bard poems in Tibet"
Complementary Thesis: "Ancient tribes on the Chinese-Tibetan borders"

DOCTORAT D'UNIVERSITE:

Doctorat d'Université: conferred by the Faculties of Letters, Law and Science. Prerequisite: the French "Licence" or the M.A. degree. Time required: usually two years. A thesis must be written in French, and an oral examination taken.

May 9, 1960. Bertrand RIOUX
Thesis: "The Concept of Truth in Saint Thomas Aquinas and the Renaissance of Ontology"

May 16, 1960. Georges BOLLES
Thesis: "Research on Psychotherapy of the Hypothyroid Child"

May 25, 1960. Juan Ventura Agudiez ALVAREZ
Thesis: "Ganivet the Novelist"

June 4, 1960. Graeme Douglas WATSON
Thesis: "Romain Rolland and the Significance of Humanity in Jean Christophe"

June 7, 1960. Wallace KIRSOP
Thesis : "Clovis Hesteau, sieur de Nuysement and the alchemist literature of the end of the 16th and beginning of the 17th centuries"

June 9, 1960. Hassan Gholi MOAYEDI
Thesis: "The Seldjoukides in Azarbaydjan"

June 10, 1960. Jan KOCHANOWSKI
Thesis: "Introduction to the phonology of European Romany"

June 13, 1960. Ruth MURPHY
Thesis: "Saint Francis of Sales and Christian Society"

June 14, 1960. Syeda Surriya SULTANA
Thesis: "Garcin de Tassy - A biography and critical study of his works"

June 17, 1960. Philip John YARROW
Thesis: "The political and religious thought of Barbey d'Aurevilly"

June 17, 1960. Mohannad SAFA
Thesis: "A study of the poem Yousef et Zoleikhâ, attributed to Ferdowsi"

June 17, 1960. André FUTTERKNECHT
Thesis: "The pharmaceutic industry in Germany"

June 17, 1960. Jérôme CZEKAJ
Thesis: "A study of air traffic between France and the American coastal countries of the North Atlantic and the Caribbean Sea (Canada, the United States, Mexico)"

June 20, 1960. Joachim MARCUS-STEIFF
Thesis: "The studies of motivation - history and method"

Summary of the Doctoral Thesis of Paul Vicaire (Doctorat d'Etat), April 30, 1960.

PLATO - Literary Critic

Calling Plato a literary critic may seem paradoxical. In modern literature criticism has become a profession, and our concept of the writer who specializes in judging other people's work cannot easily be applied to the author of the Republic.

Undoubtedly however, literature constituted an important object of Platonic thought, even if the philosopher devoted only a small number of works to it. Besides the passages from the Republic and the Laws on poetry, from Ion on inspira-

tion, from Gorgia and Phèdre on rhetoric, in the Dialogues are to be found many citations, allusions, and brief commentaries which reveal a curiosity and alert sensitivity, and a constant tendency to express, or at least suggest his tastes in literature.

These judgments would seem capable of integration into an all-inclusive view of creativity, in both the poets and the rhetoricians.

This study shows that Plato's attitude towards poetry and rhetoric was not a simple one. Struck by poetry's general power to disturb and agitate, the philosopher proposed censuring all "mimesis" which contain error and which depict passions and their disorders. This is why he condemns Homer's poetry, and dramatic art in the Republic, and most especially tragedy in the Laws. But it is true that poetry can redeem itself if it is really inspired and seeks only harmonies and edifying models. This is the case for Pindar, Aeschylus, in as far as they spoke in true and elevated language, and sometimes even for Homer. As for rhetoric, although Plato obviously points out the faults to be found in it (in the Dialogues there is the whole arsenal of arguments and examples necessary to criticize this art), it is nevertheless not summarily judged. On the one hand Plato recognizes certain individual qualities in the rhetoricians, on the other he shows rhetoric a path towards regeneration and health: it could realize its great potential in becoming dialectic.

In an ideal perspective the inspired poet who only reproduces beautiful models, and the rhetorician who accepts the practice of dialectic, tend to approach the philosopher, who is also, it seems, the ideal critic.

Published by Librairie Klincksieck, Paris, 1960

Resumé of Doctoral Thesis of Mme Marianne B. Cermakian (Doctorat d'Université), Paris, May 7, 1960.

A POLITICAL AND LITERARY FRIENDSHIP:
Madame de Maintenon and la Princesse des Ursins

This thesis, based on a study of the correspondence between the Princesse des Ursins and Mme de Maintenon, is divided into two parts:

The first is a history of the friendship which united Mme de Maintenon, the second wife of Louis XIV, and the Princesse des Ursins, a French "grande dame" married for the second time to an Italian prince. After several trips around France and to Rome, the Princesse des Ursins was named first lady in waiting to the young wife of King Philippe V of Spain, grandson of Louis XIV. During the long war of the Spanish succession, the Princesse des Ursins, loyal to the Spanish monarchy, and Mme de Maintenon, spokesman for the French monarchy, wrote to each other every week from 1705 to 1715.

Their relationship, which had been purely social during the fifty years they had known each other, was transformed into a stormy friendship. It was a sincere

one, however, since it survived the retreat of Mme de Maintenon and the disgrace of Mme des Ursins. The last chapter, in particular, filled with unedited documents, sheds new light on the last years of the Princesse, and shows that the two continued to correspond up to the time of the death of Mme de Maintenon.

The second part is devoted to a literary study of the correspondence. Mme de Maintenon has a place among the great letter writers of the 17th century, but the Princesse is less well known as an epistolary writer. One chapter analyzes the ability and literary training of the two women. The study of their language and their style rests largely on a comparison of the unique printed edition of their correspondence (Bossange, 1826) and the manuscript copy at the British Museum. The following chapters point up the descriptive and moral qualities of the Princesse des Ursins and Mme de Maintenon and shows them finally as they portrayed themselves, in everyday life as well as political affairs.

Summary of the Doctoral Thesis of Pierre Chaunu (Doctorat d'Etat), May 21, 1960.

SEVILLE AND THE ATLANTIC (1504-1650)

This dissertation (thèse principale) consists of four volumes of a thirteen volume work by Huguette and Pierre Chaunu. The first part of the work is devoted to statistics, the second part which Mr. Pierre Chaunu submitted as a thesis, is interpretive. (1)

In the eighth volume begins the interpretive section dealing with the period from 1504 to 1650. It consists of three volumes and an atlas. Volume VIII (a) is devoted to the geographic structure of the Atlantic and Spanish-American areas controlled by Seville. It is undoubtedly the most exhaustive study of historic American geography ever to have appeared.

The novelty of their conclusions is derived in part from the original statistical mass of information which exceeds that which is given in the statistical sections.

"Conjuncture" attempts to explain and clarify the whole Atlantic and American history during the XVIth and early XVIIth centuries.

The small atlas illustrates several aspects of these new findings. (2)

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(1) THESE FOUR VOLUMES ARE: VOL. VIII (A): GEOGRAPHIC STRUCTURES: VOL. VIII (B): CONJUCTURES (1504-1592): VOL. VIII (B BIS): CONJUCTURE (1593-1650). GRAPHIC APPENDEX OR ATLAS.

(2) THIS WORK IS BEING PUBLISHED BY SEVPEN, 13 RUE DU FOUR, PARIS VIE.

COSMÈTE

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L'AMI

DE L'INSTRUCTION PUBLIQUE,

PUBLIÉ

PAR J.-H. VA

RAPPORT

ET

PROJET DE DÉCRET

Sur l'organisation générale de l'Instruction publique,

PRÉSENTÉS

A L'ASSEMBLÉE NATIONALE,

AU NOM DU COMITÉ

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Rapport de M. André ME

rofesseur agrégé à l'École Normale d'

Responsable Pédagogique

de l'« Union Française Ur

ÉMILE,

OU

DE L'ÉDUCATION.

Par J. J. ROUSSEAU,

Citoyen de Genève.

Sanabibos ægrotamus malis ; ipsique nos in nobis
genitos natura, fi emendari velimus, juvat.
Sen : de ird. L. II. c. 13.

TOME PREMIER.

A AMSTERDAM,

Chez JEAN NEAULME, Libraire.

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Avec Privilège de Nosseign. les Etats de Hollande & de Westfrise.

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4° Ces devoirs, que l'on fait désormais en classe, seront corrigés en classe. Cela ne dispense pas le maître de reprendre après la classe les cahiers des élèves pour noter les exercices et s'assurer qu'il [illegible] d'erreurs dans ses cor- [illegible] naturalit trop insis- [illegible] l'enfant

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